Subj: **Manifest Copies**
Date: 7/28/2008 2:15:41 P.M. Pacific Daylight Time
From: lmurrill@wm.com
To: (b) (6)

Attached please find copies of 6 manifests for waste for profile AK2940 which was received here at Chemical Waste Management on 4/28/92 and 4/29/92.

This info was requested per our telephone conversation on 7/24/08.

<<AK2940 Manifests.tif>>

Lynn Murrill
Billing Department
Chemical Waste Management of the NW
Arlington OR
Phone: 541-454-3235
Fax: 541-454-3279
lmurrill@wm.com

1323 [illegible]

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: W A D 00756940

Manifest Document No.: 118-2

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Silicon MetalTech, Inc., P. O. Box 361, Wenatchee, Wa 98807-0361
100 S. 4th Stree, Rock Island, Wa 98850

4. Generator's Phone (509) 884-7171

A. State Manifest Document Number

B. State Generator's ID

5. Transporter 1 Company Name: Chem Waste Management Co.

6. US EPA ID Number: ORD 089452353

C. State Transporter's ID

D. Transporter's Phone [illegible]

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
Chemical Waste Management
17629 Cedar Springs Lane
Arlington, Oregon 97812

10. US EPA ID Number: ORD 089442353

G. State Facility's ID

H. Facility's Phone

11. US DOT Description (*Including Proper Shipping Name, Hazard Class, and ID Number*)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID NOS CONTAMINATED SOIL ORM-E NA9189		001	DT	42,200		D009
b.						
c.						
d.						D81

J. Additional Descriptions for Materials Listed Above
PLACARD DOT ID 9189 D009

K. Handling Codes for Wastes Listed Above
AK9940 [illegible]
L13-2-G-10-18-9

15. Special Handling Instructions and Additional Information
SILICON METALTECH, INC. TELEPHONE NUMBER 509-884-7171
ERG 31

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

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Printed/Typed Name: J. E. MARTIN | Signature: [signature] | Month 04 Day 27 Year 92

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: JERRY LEE RUISE | Signature: Jerry Lee Ruise | Month 04 Day 27 Year 92

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space
SEC 1 S/B WAD 000756940, SEC 6 S/B [illegible] SEC 10 S/B ORD 089452353, SEC 14 add P, SEC 15 add AK 2940 PER JOHN WINTER PLANT METALURGIST
SEC H. OMITTED SEC 11a ADDITIONAL INFO INCORRECT

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name: [signature] | Signature: [signature] | Month Day Year: [illegible]

GENERATOR / TRANSPORTER / FACILITY

TRANSPORTER #2

132319

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. W A D 00756940	Manifest Document No. 118-1	2. Page 1 of 1	Information in the shaded areas is not required by Federal law.	

3. Generator's Name and Mailing Address
Silicon MetalTech, Inc., P. O. Box 361, Wenatchee, WA 98807-0361
100 S. 4th Street Rock Island, Wa 98850
4. Generator's Phone (509) 884-7171

A. State Manifest Document Number
B. State Generator's ID

5. Transporter 1 Company Name: Chem Waste Management
6. US EPA ID Number: ORD 089452353
C. State Transporter's ID
D. Transporter's Phone 503-454-2643

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Transporter's ID
F. Transporter's Phone

9. Designated Facility Name and Site Address
Chemical Waste Management
17629 Cedar Springs Lane
Arlington, Oregon 97812
10. US EPA ID Number: ORD 089452353
G. State Facility's ID
H. Facility's Phone

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. CONTAMINATED SOIL RQ HAZARDOUS WASTE SOLID NOS ORM-E NA9189		001	DT	44,860		D009
b.						
c.						
d.						OR1

J. Additional Descriptions for Materials Listed Above
PLACARD DOT ID 9189 D009

K. Handling Codes for Wastes Listed Above
AK9940 7614 4000
L13, 1-2 G 40-1E E4

15. Special Handling Instructions and Additional Information
SILICON METALTECH, INC. TELEPHONE NUMBER 509-884-7171
ERG 31

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Printed/Typed Name	Signature	Month	Day	Year
J. E. MARTIN	[signature]	04	27	92

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Steve Thomas	Steve Thomas	04	27	92

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space Sec 1 S/B WAD000756940, Sec 6 S/B ILD099202681, Sec 10 S/B ORD089452353, Sec 14 add P. Sec 15 add AK9940 PER JOHN WINTER PLANT METALURGIST
SEC H OMITTED SEC 11a ADDITIONAL INFO INCORRECT

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
Rona Re	Rona Re	04	28	92

GENERATOR / TRANSPORTER / FACILITY

TRANSPORTER #2

CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST 181109

NATIONAL RESPONSE CENTER 1-800-424-8802
OREGON ACCIDENT RESPONSE CENTER 1-800-452-0311

Please print or type. *(Form designed for use on elite (12-pitch) typewriter.)* B241

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. W A D 0 0 7 5 6 9 4 0 1 — Manifest Document No. 1 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
SILICON METALTECH, INC., P.O.BOX 361, WENATCHEE, WA 98807
100 S. 4TH STREET, ROCK ISLAND, WA 98850

4. Generator's Phone (509) 884-7171

5. Transporter 1 Company Name: Chem Waste Management Co. | 6. US EPA ID Number: ~~CAD099202681~~ ORD099202681

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address
Chemical Waste Management Of The Northwest
Star Route
Arlington, Oregon 97812 | 10. US EPA ID Number: O R D 0 8 9 4 5 2 3 5 3

11. US DOT Description *(Including Proper Shipping Name, Hazard Class, and ID Number)*	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a. RQ HAZARDOUS WASTE SOLID NOS ORM-E NA9189 (D009)	001	DT	45,420	P
b.				
c.				
d.				

15. Special Handling Instructions and Additional Information — Waste Profile Sheet Number(s)
a. SILICON METALTECH, INC. TELEPHONE NUMBER 509-884-7171
b.
c. ERG-31
d.

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name	Signature	Month	Day	Year
J. E. MARTIN		04	28	92

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
JERRY LEE RUISE	Jerry Lee Ruise	04	28	92

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

FACILITY

19. Discrepancy Indication Space
SEC I EPA ID NUMBER S/B WAD 000756940 SEC 15a ADD AK2940
PER JOHN WINTER PLANT METALURGIST

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
Joyce Stevens	Joyce Stevens	04	28	92

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

T/S/D/F-COPY

CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST

1138 / 132432

NATIONAL RESPONSE CENTER 1-800-424-8802
OREGON ACCIDENT RESPONSE CENTER 1-800-452-0311

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. W A D 0 0 7 5 6 9 4 0 — Manifest Document No. 1 1 9 — 2

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
SILICON METALTECH, INC., P.O. BOX 361, WENATCHEE, WA 98807
100 S. 4TH STREET, ROCK ISLAND, WA 98850

4. Generator's Phone (509) 884-7171

5. Transporter 1 Company Name: Chem Waste Management Co.
6. US EPA ID Number: O R D 0 8 9 4 5 2 3 5 3

7. Transporter 2 Company Name
8. US EPA ID Number

9. Designated Facility Name and Site Address
Chemical Waste Management
Of The Northwest
Star Route
Arlington, Oregon 97812
10. US EPA ID Number: O R D 0 8 9 4 5 2 3 5 3
503-454-2643

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. RQ HAZARDOUS WASTE SOLID NOS ORM-E NA 9189	001	DT	44,720	P
b.				
c.				
d.				

15. Special Handling Instructions and Additional Information — Waste Profile Sheet Number(s)
a. SILICON METALTECH, INC., TELEPHONE NUMBER 509-884-7171
b. ERG-31
c.
d.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled; and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name	Signature	Month	Day	Year
J. E. MARTIN		0 4	2 8	9 2

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Steve Thomas	Steve Thomas	0 4	2 8	9 2

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

FACILITY

19. Discrepancy Indication Space
Sec 1 S/b WAD007569402, Sec 6 S/b ILD099202681
Sec 15c add AK2940 per John Wuntz, Plant Metallurgist
Sec 11a ADDITIONAL INFO OMITTED

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
SARA RINEY	Sara Riney	0 4	2 8	9 2

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

T/S/D/F-COPY

CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST 181109

NATIONAL RESPONSE CENTER 1-800-424-8802
OREGON ACCIDENT RESPONSE CENTER 1-800-452-0311

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) 132585 Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. W A D 0 0 0 7 5 6 9 4 0 | Manifest Document No. 1 2 0 - 2 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
SILICON METALTECH, INC., P.O. BOX 361, WENATCHEE, WA 98807
100 S. 4TH STREET, ROCK ISLAND, WA 98850

4. Generator's Phone (509) 884-7171

5. Transporter 1 Company Name: Chem Waste Management Co. | 6. US EPA ID Number: I L D 0 9 9 2 0 2 6 8 1

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address
Chemical Waste Management Of The Northwest
Star Route
Arlington, Oregon 97812 | 10. US EPA ID Number: O R D 0 8 9 4 5 2 3 5 3

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol
a. RQ HAZARDOUS WASTE SOLID NOS ORM-E NA 9189	001	DT	43880	P
b.				
c.				
d.				

GENERATOR

15. Special Handling Instructions and Additional Information **Waste Profile Sheet Number(s)**
a.
b. SILICON METALTECH, INC., TELEPHONE NUMBER: 509-884-7171
c. ERG-31
d.

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name: J. E. MARTIN | Signature: [signature] | Month Day Year: 0 4 2 9 9 2

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: JERRY LEE RUISE | Signature: Jerry Lee Ruise | Month Day Year: 0 4 2 9 9 2

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space
SEC 11a ADDITIONAL INFO OMITTED
SEC 15a ADD AK2940 PER JOHN WINTER PLANT METALURGIST

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: SARA RINEY | Signature: Sara Riney | Month Day Year: 04 29 92

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

T/S/D/F-COPY

CHEMICAL WASTE MANAGEMENT OF THE NORTHWEST 1138

NATIONAL RESPONSE CENTER 1-800-424-8802
OREGON ACCIDENT RESPONSE CENTER 1-800-452-0311

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) 13281 Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. WAD000756940 Manifest Document No. 120-1
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
SILICON METALTECH, INC., P.O. BOX 361, WENATCHEE WA 98807
100 S. 4th STREET, ROCK ISLAND, WA 98850

4. Generator's Phone (509) 884-7171

5. Transporter 1 Company Name: Chem Waste Management Co.
6. US EPA ID Number: ILD099202681

7. Transporter 2 Company Name
8. US EPA ID Number

9. Designated Facility Name and Site Address
Chemical Waste Management Of The Northwest
Star Route
Arlington, Oregon 97812
10. US EPA ID Number: ORD089452353

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. RQ HAZARDOUS WASTE SOLID NOS ORM-E NA 9189	001	DT	43540	P
b.				
c.				
d.				

15. Special Handling Instructions and Additional Information **Waste Profile Sheet Number(s)**
a.
b. SILICON METALTECH, INC. TELEPHONE NUMBER: 509-884-7171
c. ERG-31
d.

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name	Signature	Month Day Year
J. E. MARTIN		04 29 92

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year
Steve THOMAS		04 29 92

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year

FACILITY

19. Discrepancy Indication Space
SEC 11a ADDITIONAL INFO OMITTED
SEC 15a ADD AK2940 PER JOHN WINTER PLANT METALURGIST

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month Day Year
SARA RINEY		04/29/92

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

T/S/D/F-COPY

Patrick H. Wicks, PE, CHMM
19125 Northcreek Parkway, Suite 111
Bothell, Washington 98011-8002
(206) 485-3437
FAX (206) 483-1058

March 9, 1989

Mr. Dennis Bowhay
Washington Department of Ecology
3601 West Washington
Yakima, Washington 98903

Dear Mr. Bowhay:

Enclosed is one copy of our report, Characterization of Mercury in Soil and Fill at Silicon Metaltech, Inc., Rock Island, Washington, for your review.

Please do not hesitate to call me if there are any questions regarding the above.

Sincerely,

Patrick H. Wicks, PE, CHMM

PHW:gac

Enclosure

"Hg Cleanup"

PERKINS COIE

A LAW PARTNERSHIP INCLUDING PROFESSIONAL CORPORATIONS
1201 THIRD AVENUE, 40TH FLOOR · SEATTLE, WASHINGTON 98101-3099
TELEPHONE: (206) 583-8888 · FACSIMILE: (206) 583-8500

MARK W. SCHNEIDER
(206) 583-8627
SCHNM@PERKINSCOIE.COM

March 11, 1996

Mr. James E. Trunzo
American Silicon Technologies
100 So. 4th
P.O. Box 68
Rock Island, WA 98850

Mr. Patrick H. Wicks
Environmental Engineering & Consulting, Inc.
3689 South Resort Rd.
Greenbank, WA 98263

Re: Pacific Groundwater Group Report

Dear Jim and Pat:

At long last, enclosed is a copy of Pacific Groundwater Group's May 13, 1994 report.

Sincerely,

Mark

Mark W. Schneider

MWS:aw

Enclosure

[21484-0002/SL960710.029]

CYPRUS AMAX
Minerals Company

Cyprus Amax Minerals Company
9100 East Mineral Circle
Post Office Box 3299
Englewood, Colorado 80112-3299
(303) 643-5838
Fax: (303) 643-5181

C. Corwin Bromley
Senior Attorney, Environmental

March 4, 1996

Mark W. Schneider
Perkins Coie
1201 Third Avenue - 40th Floor
Seattle, Washington 98101-3099

Re: Silicon Metaltech, Inc. Plant Well Data

Dear Mr. Schneider:

Enclosed please find the May 13, 1994 "Monitoring Well Installation and Groundwater Sampling Report" for the American Silicon Technologies Site, Rock Island, Washington, prepared by Pacific Groundwater Group. I hope this is of assistance to your client.

Should you have any questions, please call me.

Sincerely,

C. Corwin Bromley

encl.

cc: S. Hooper, Cyprus Foote Mineral Company
C. Ellingson, Pacific Groundwater Group

MONITORING WELL INSTALLATION AND GROUNDWATER SAMPLING REPORT
AMERICAN SILICON TECHNOLOGIES SITE
ROCK ISLAND, WASHINGTON

May 13, 1994

Prepared for:
Cyprus Foote Mineral Co.

Prepared by:
Pacific Groundwater Group
2377 Eastlake Ave East
Seattle, WA 98102
(206) 329-0141

JE9009.03

MONITORING WELL INSTALLATION AND GROUNDWATER SAMPLING REPORT
AMERICAN SILICON TECHNOLOGIES SITE
ROCK ISLAND, WASHINGTON

This report documents the installation and sampling of three monitoring wells on the referenced site. It also summarizes regional water quality data and site activities that prompted the installation of the wells. The American Silicon Technologies (AST) site is located along the east bank of the Columbia River in Douglas County about 10 miles south of Wenatchee, Washington (Figure 1).

The scope of work for this project consisted of:

- Collection and review of historical water quality data from the nearby City of Rock Island.
- Collection and review of logs of public and private wells contained in the Department of Ecology files.
- Installation of three monitoring wells surrounding the old laboratory building on the AST site.
- Sampling of the three monitoring wells and one on-site water supply well, and analysis of samples for filtered and total mercury.

The work was authorized by J.E. Sanderson of Cyprus Foote Minerals Company on February 1, 1994 (Purchase Order No. RE 12682). The work was performed and this report was prepared in general accordance with accepted hydrogeologic practices, in this vicinity and at this time, for the exclusive use of Cyprus Foote Minerals Company, and for exclusive application to the AST site. This in lieu of other warranties, express or implied.

SUMMARY OF FINDINGS

- Groundwater near the old laboratory site does not contain dissolved mercury at detectable concentrations using standard methods and 10 micron filters. Total mercury concentrations were also not detectable except in one monitoring well which contained total mercury at the low level of 0.0005 milligrams per liter (mg/L).

- Shallow groundwater below the old laboratory site was flowing towards the AST pumping well in February 1994 when measurements were made. The pumping of the AST production wells should prevent shallow groundwater from the old laboratory site from flowing toward public or private supply wells in the Rock Island community.

- The existing groundwater chemistry and water level monitoring data indicate that off-site migration of mercury from the old laboratory site is not occurring via the groundwater pathway. The Rock Island community wells do not appear threatened by mercury remaining in soils above the water table at the old lab site.

HISTORY OF SITE ACTIVITIES

American Silicon Technologies and previous owners of the plant produce silicon metal in a facility located adjacent to the Columbia River in Rock Island, Washington. In 1988, under the previous owner Silicon Metaltech, soil samples taken in the area of the old laboratory and sediment trap indicated elevated levels of mercury. While the source of the mercury is unknown, past facility practice is thought to have included the use of mercuric chloride in the on-site laboratory until about 20 years ago. Mercuric chloride wastes may have been disposed of in laboratory sinks.

Figure 2 shows the laboratory arrangement as interpreted from site blue prints and other previous drawings. The sink drains were connected to a concrete sediment trap beneath the original lab building. The sediment trap was connected via a clay pipe to a dry well which still exists. The sediment trap has been erroneously described as the dry well in previous documentation.

SUMMARY OF MONITORING WELL INSTALLATION

On February 17 and 18, 1994, three monitoring wells were installed at the locations shown in **Figures 2 and 3**. The wells were drilled by the TUBEX® method by Environmental West Exploration Inc. of Spokane, Washington . The borings penetrated coarse sandy fill and sand and gravel sediments to depths of about 40 feet where they were completed as two-inch PVC monitoring wells. **Table 1** presents well construction, survey, and water level information. **Appendix A** presents field methods and boring logs.

SUMMARY OF HYDROGEOLOGY AND GROUNDWATER FLOW

The AST plant lies on a deposit of coarse sand and gravel of glacial flood origins. The sand and gravel deposit is greater than 100 feet thick over most of the Rock Island bottom land (DPRA, 1991). The sand and gravel overlie bedrock comprised of the Columbia River Basalts. Depth to the water table is about 25 feet.

The sand and gravel deposit is a highly transmissive aquifer tapped by three AST wells and numerous public and private wells in the Rock Island bottom land (**Figures 1 and 2**). **Figure 1** shows the density of off-site private and public wells on record with the Department of Ecology in the Rock Island vicinity. Work by Washington State University (Raforth, 1990) demonstrates a highly dynamic (transient) flow regime in the Rock Island bottom land. Groundwater flow directions are from the northwest most of the time but may reverse in some locations during times of high withdrawls and/or high river pool stages. Although flow directions may reverse at times, the net groundwater flow direction is likely from the northwest to the southeast.

At the AST site groundwater flow directions are dominated by drawdown of the water table surrounding the on-site pumping well. **Table 1** presents monitoring well survey and water level data collected on March 1, 1994. The data are shown graphically on **Figure 3** and indicate a groundwater flow direction towards AST production well No. 2 which was pumping at the time. The reported pumping rate at AST averages 1800 gallons per minute (gpm) and is continuous. Well 2 is the primary production well. Well 1 is used only in emergencies and well 3 is seldom used because it has bacterial clogging problems.

The old laboratory site appears to be within the cone of depression and capture zone of the on-site production wells. Groundwater flow to the production wells is radial (comes from all directions) near the production wells. Therefore the northwest groundwater flow direction demonstrated by the three on-site monitoring wells does not indicate flow from the AST site to public and private wells to the northwest of AST. In fact, the presence of the AST production wells probably prevents groundwater flow from below the old laboratory to the public or private supply wells in the Rock Island community.

HISTORY OF ROCK ISLAND GROUNDWATER METALS CONCENTRATIONS

Arsenic and selenium in groundwater has been an issue in the Rock Island bottom land since first detected at elevated levels in a Washington State University (WSU) study in 1978 and 1979. A mercury-in-groundwater "scare" occurred later, in 1989. The 1989 mercury scare occurred when a non-State-certified lab reported high concentrations of arsenic and mercury in a sample of groundwater from a City of Rock Island well (Raforth, 1991). An internal Ecology memo states that "The 1989 'scare' from high levels, solicited by the Rock Island mayor, was clearly assigned to lab error..." (Pratt, 1991). Raforth (1991) further reports that the concentration of mercury reported by a certified lab in a follow-up sample was 0.0028 mg/L compared to the drinking water Maximum Contaminant Level (MCL) of 0.002 mg/L. Data supplied for this project by the Washington State Department of Health (DOH) did not contain the data referenced above. Contrary to the data cited above, the State DOH records indicate that the two City of Rock Island operative wells were sampled three times in 1989 and that mercury was not detected in any sample (at detection limits of 0.0005 and 0.001 mg/L). The last sampling records in the DOH records are from 1990 and no mercury was detected in those samples either.

The marginal exceedance of the mercury MCL prompted the City of Rock Island to apply for grant funds to monitor groundwater quality in eight to ten wells on an quarterly basis. In addition, internal Ecology communication indicates that the Department of Ecology Central Region supports the installation of monitoring wells on the AST site near the old lab. (Raforth, 1990 and Pratt, 1991).

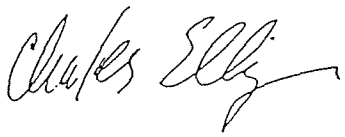
MERCURY CONCENTRATIONS IN GROUNDWATER FROM THE ON-SITE WELLS

Samples from the three monitoring wells and supply well No. 2 were collected on March 1, 1994. The monitoring wells were purged using a Brainard-Kilman hand pump until temperature, pH and specific conductance were stable. Samples were collected using a Teflon bailer. The bailer was pressurized and fitted with a 10 micron in-line filter for collection of filtered samples. A 10-micron filter was selected to exclude aquifer suspended sediment that is too large to be potentially mobile in the aquifer, but allow passage of colloids and other potentially mobile solids. Sample containers were acidified. Samples were delivered to Analytical Resources Inc. and Friedman-Bruya laboratories for analysis of filtered and total mercury by Cold Vapor Atomic Absorption Spectrophotometry. The quality of the data were reviewed by Pacific Groundwater Group and found to be acceptable. **Appendix B** contains the quality assurance report and laboratory analysis records. **Table 2** summarizes the field parameter and mercury concentration data.

Mercury in filtered samples was undetectable in each sample at a detection limit of 0.0001 mg/L. Total mercury concentrations were also below detection limits except for MW-1 which had a total mercury concentration at a low level of 0.0005 mg/L. None of the concentrations exceed the MTCA Method A mercury cleanup level of 0.002 mg/L.

Field parameters of three of the four samples collected were very similar (pH of 7.3, temperature about 60 degrees Fahrenheit, and specific conductance of 410 to 440 microseimens (uS). The exception is MW-1 which had similar pH and temperature as the other wells, and started with a specific conductance of 400 uS during purging, but which had a final specific conductance of 280 uS. The reason for the discrepancy in specific conductance is not known; measurement error is possible.

PACIFIC GROUNDWATER GROUP



Charles T. Ellingson
Principal Hydrogeologist

REFERENCES

DPRA, 1991, Draft Site Hazard Assessment Report, Silicon Metaltech, Inc. (Lab and Lagoon Sites), Rock Island, Washington, Prepared for Washington State Department of Ecology.

Pacific Groundwater Group, 1991, Draft Assessment of Mercury Contamination in Soil, Silicon Metaltech, Inc., Rock Island, Washington, Prepared for Cyprus Minerals Company, Inc., JE9009.

Pratt, C., 1991, Washington State Department of Ecology Memorandum to Bob Raforth, Subject Matter: "Observations on Bob Raforth's 12/31 Rock Island Memo", dated January 4, 1991.

Raforth, R., 1990, Washington State Department of Ecology Memorandum to John Fahsholtz, Subject matter: "Water Quality at Rock Island, dated December 31, 1990".

Wicks, P.H. ;1989; Environmental Remediation Plan for Silicon MetalTech, Inc., Rock Island, Washington.

Table 1 - Well Construction, Survey, and Water Level Data

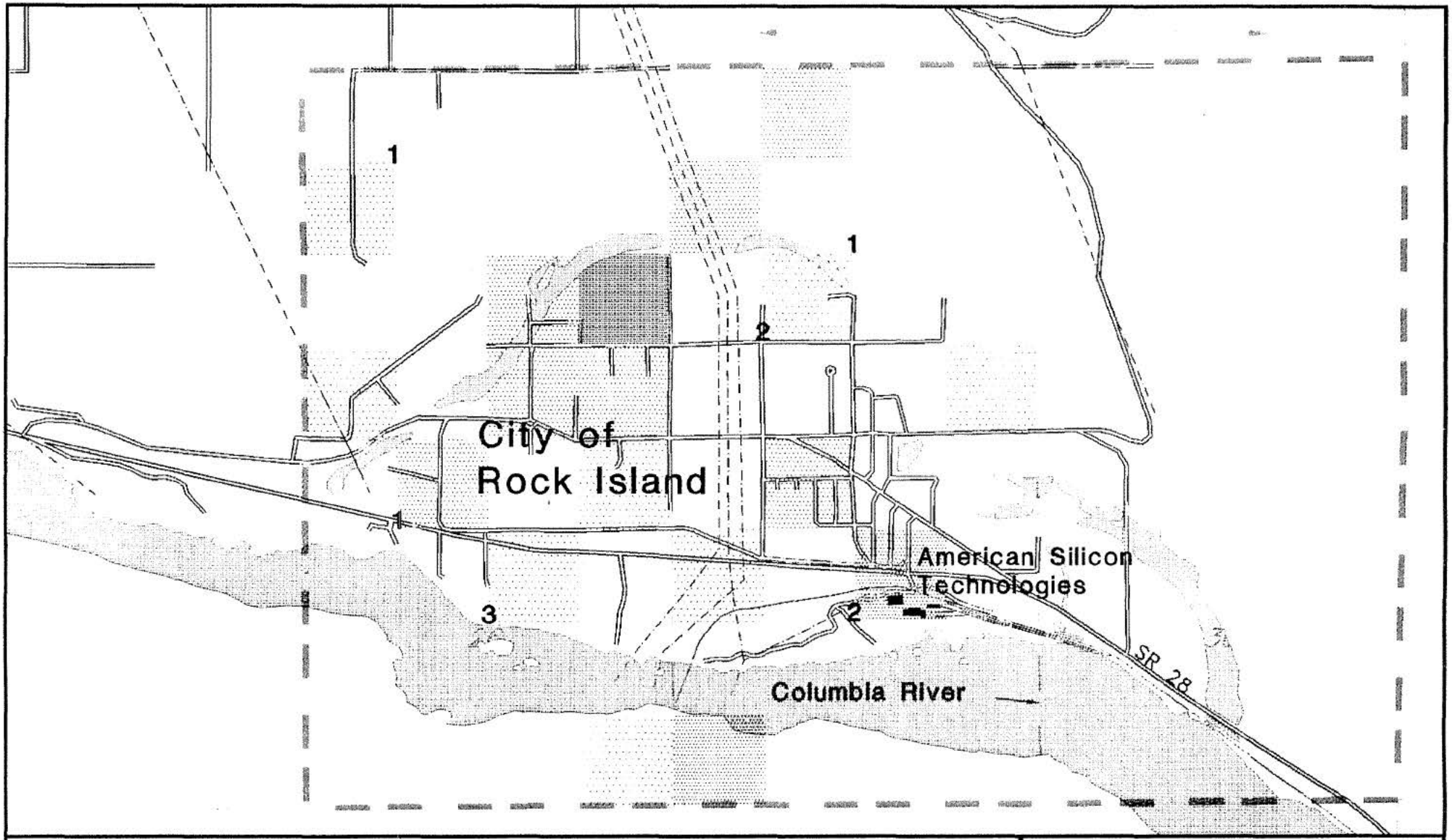
Well	Total Depth in feet (bgs)	Screen Top in feet (bgs)	Screen Bottom in feet (bgs)	Measuring Point	MP Elevation in feet	Depth to Water in feet (bMP)	Water Elevation in feet
MW-1	38	23	38	top of PVC	638.77	26.98	611.79
MW-2	40	24	39	top of PVC	640.22	28.80	611.42
MW-3	40	24	39	top of PVC	640.32	28.62	611.70

bgs= below ground surface
bMP=below Measuring Point
MP= Measuring Point
all survey data to US Coast and Geodetic Survey, Northern Pacific Supplementary adjustment of 1947
Water levels measured March 1, 1994

Table 2 - Field Parameters and Mercury Concentrations in Groundwater Samples

Well		Mercury Concentration in mg/L			Field Parameters		
	Sample Date	ARI		FBI	pH	Temp. deg. F	Spec. Cond. microseimens
		Filtered*	Total				
MW-1	1-Mar-94	<0.0001	0.0005	<0.002	7.2	61	280
MW-2	1-Mar-94	<0.0001	<0.0001	<0.002	7.3	62	410
MW-3	1-Mar-94	<0.0001	<0.0001	<0.002	7.3	59	440
AST Production Well No. 2	1-Mar-94	<0.0001	<0.0001	<0.002	7.3	57	440
MTCA Method A Cleanup Level in mg/L				0.002			

* Samples were field filtered with an in-line 10-micron filter
ARI= Analytical Resources, Inc.
FBI=Friedman & Bruya, Inc.



LEGEND

Well Density (by quarter–quarter section, based on WA Dept of Ecology well records)

☐ 0 ☐ 1 ☐ 2 ☐ 3 ▒ 4 ▒ 5

Area with well density plotted

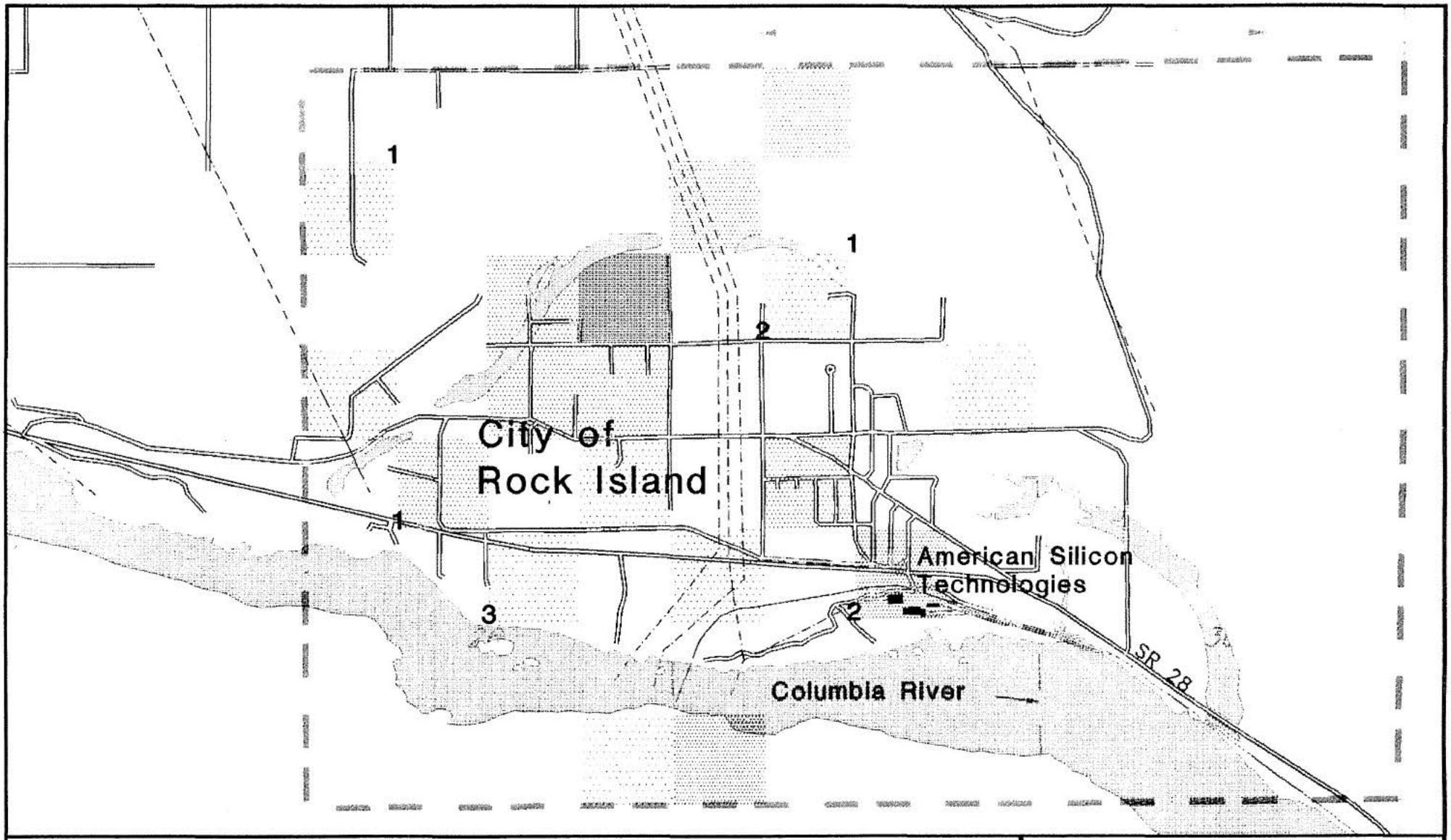
3 Number of nearby wells not included in density calculations (located to nearest section or quarter section)

0 1000 2000
Scale in Feet

FIGURE 1
Vicinity Map Showing Well Density

American Silicon Technologies for Cyprus-Foote Minerals

Pacific Groundwater Group



LEGEND

Well Density (by quarter–quarter section, based on WA Dept of Ecology well records)

☐ 0 ☐ 1 ☐ 2 ☐ 3 ▒ 4 ▒ 5

Area with well density plotted

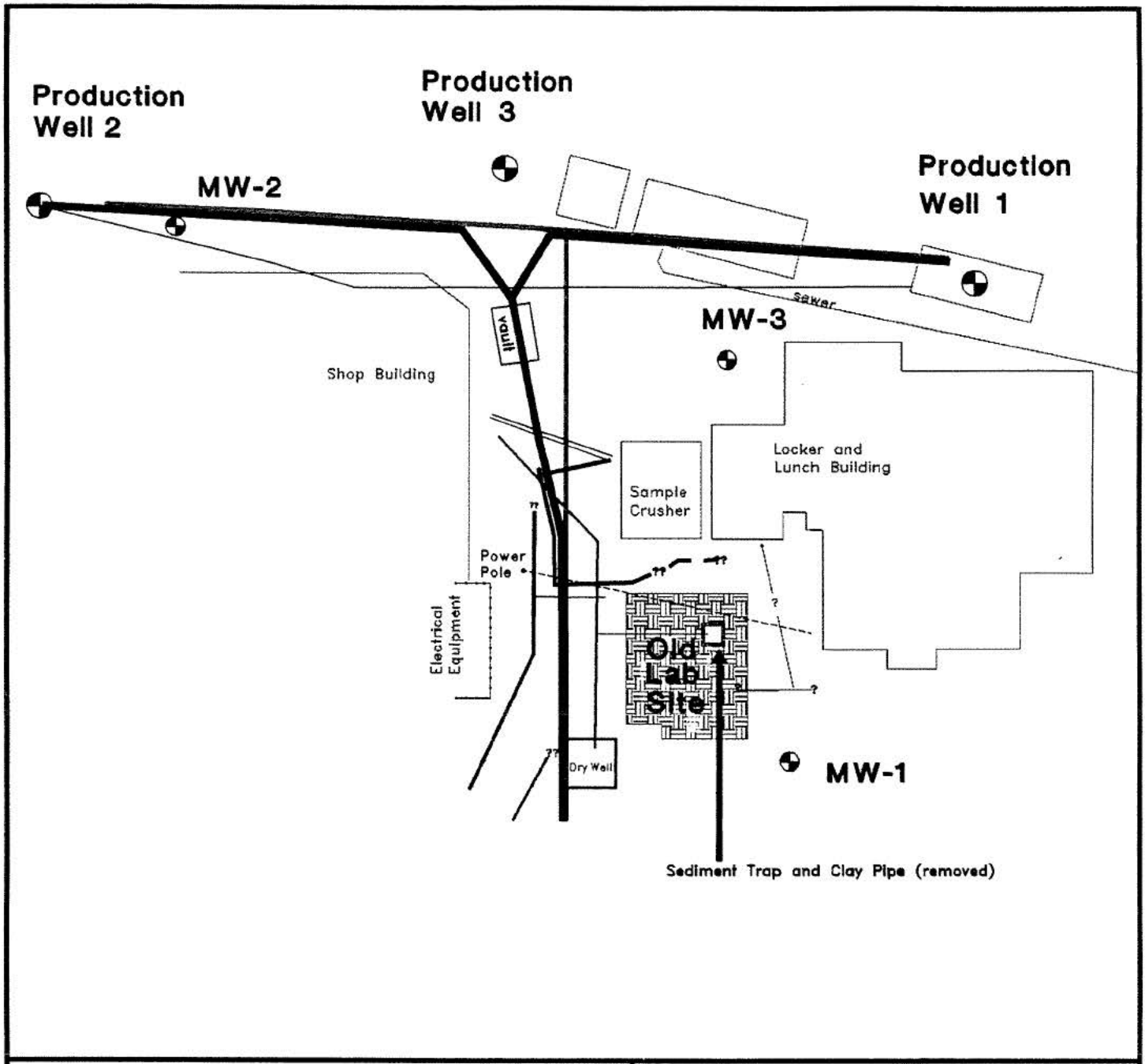
3 Number of nearby wells not included in density calculations (located to nearest section or quarter section)

0 1000 2000
Scale in Feet

FIGURE 1
Vicinity Map Showing Well Density

American Silicon Technologies
for Cyprus-Foote Minerals

Pacific Groundwater Group



Monitoring Well

Existing On-site Supply Well

Underground Air

Underground water

Underground electrical

Overhead electrical

Sanitary sewer

Drain

0 30 60

SCALE IN FEET

N

FIGURE 2
OLD LABORATORY AREA SITE PLAN

American Silicon Technologies
for Cyprus-Foote Minerals

Pacific Groundwater Group

JOB JE9009, FIG2.DWG

APPENDIX A - FIELD METHODS AND BORING LOGS

WELL DRILLING

Three monitoring wells were installed at the locations shown in **Figures 2 and 3**. The wells were drilled by the TUBEX® method by Environmental West Exploration Inc. of Spokane, Washington on February 17 and 18, 1994. The borings penetrated coarse sandy fill and sand and gravel sediments to depths of about 40 feet where they were completed as two-inch PVC monitoring wells. Only blow-back samples of soil were collected. Drill cuttings were contained in a wooden pallet lined with plastic. The drill rig and drill tools were decontaminated between borings using a high pressure, hot water washer. **Table 1** presents well construction, survey, and water level information. **Figure A-1** describes terminology on the boring logs. Boring Logs are presented as **Figures A-2, A-3, and A-4.**

WELL SAMPLING

The monitoring wells were purged using a Brainard-Kilman hand pump until temperature, pH and specific conductance were stable. Samples were collected using a Teflon bailer. The bailer was fitted with a 10 micron in-line filter and pressurized for collection of filtered samples. Sample containers were acidified. Samples were delivered to Analytical Resources Inc. and Friedman-Bruya laboratories for analysis of filtered and total mercury. **Table 2** presents the field parameter and mercury concentration data.

Figure A-I KEY TO SOIL BORING LOGS

Sample Descriptions

Classification of soils in this report is based on visual field observations which include density/consistency, moisture condition, grain size, and plasticity estimates. The field estimates should not be construed to imply field or laboratory testing unless presented implicitly. Visual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions follow the format: Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, and additional remarks. Three of these terms are defined below.

Density/Consistency

Soil density/consistency in borings is related to the Standard Penetration Resistance or blow counts in units of blows per foot taken as the bottom foot of a standard 18-inch split-spoon sampler.

SAND or GRAVEL	Blow Counts	SILT OR CLAY	Blow Counts
very loose	0 to 4	very soft	0 to 2
loose	4 to 10	soft	2 to 4
medium dense	10 to 30	medium stiff	4 to 8
dense	30 to 50	stiff	8 to 15
very dense	>50	very stiff	15 to 30
		hard	>30

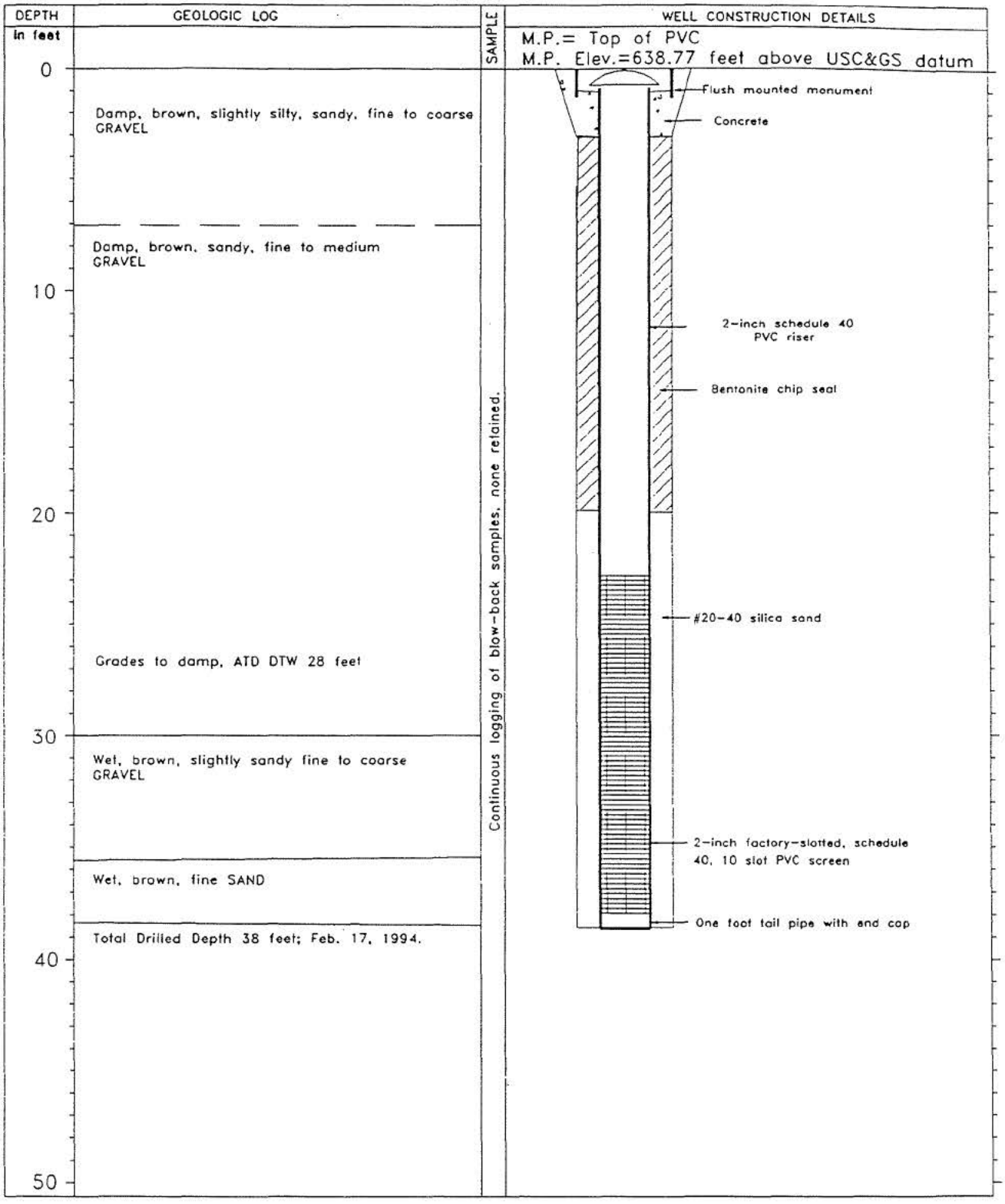
Moisture

Dry denotes little perceptible moisture.
Damp denotes minor perceptible moisture.
Moist denotes perceptible moisture, near saturation.
Wet denotes major perceptible moisture, or saturated.

Minor Constituents	Estimated Percentage
Not included in description	0 to 5
Slightly sandy, gravelly, silty, or clayey	5 to 12
Sandy, gravelly, silty, or clayey	12 to 30
Very sandy, gravelly, silty, or clayey	30 to 50

AMER. SILICON TECH. MONITORING WELLS FOR CYPRUS-FOOTE

MW-1



* Sample Submitted for Grain Size Analysis

FIGURE A-2

PROJECT NAME: Amer. Silicon Tech. for Cyprus-Foote
WELL INDENTIFICATION NUMBER: MW-1
DRILLING METHOD: 6-inch TUBEX
DRILLER: Robert Sheldon
FIRM: Environmental West
CONSULTING FIRM: Pacific Groundwater Group, Inc.
REPRESENTATIVE: Chad Bring

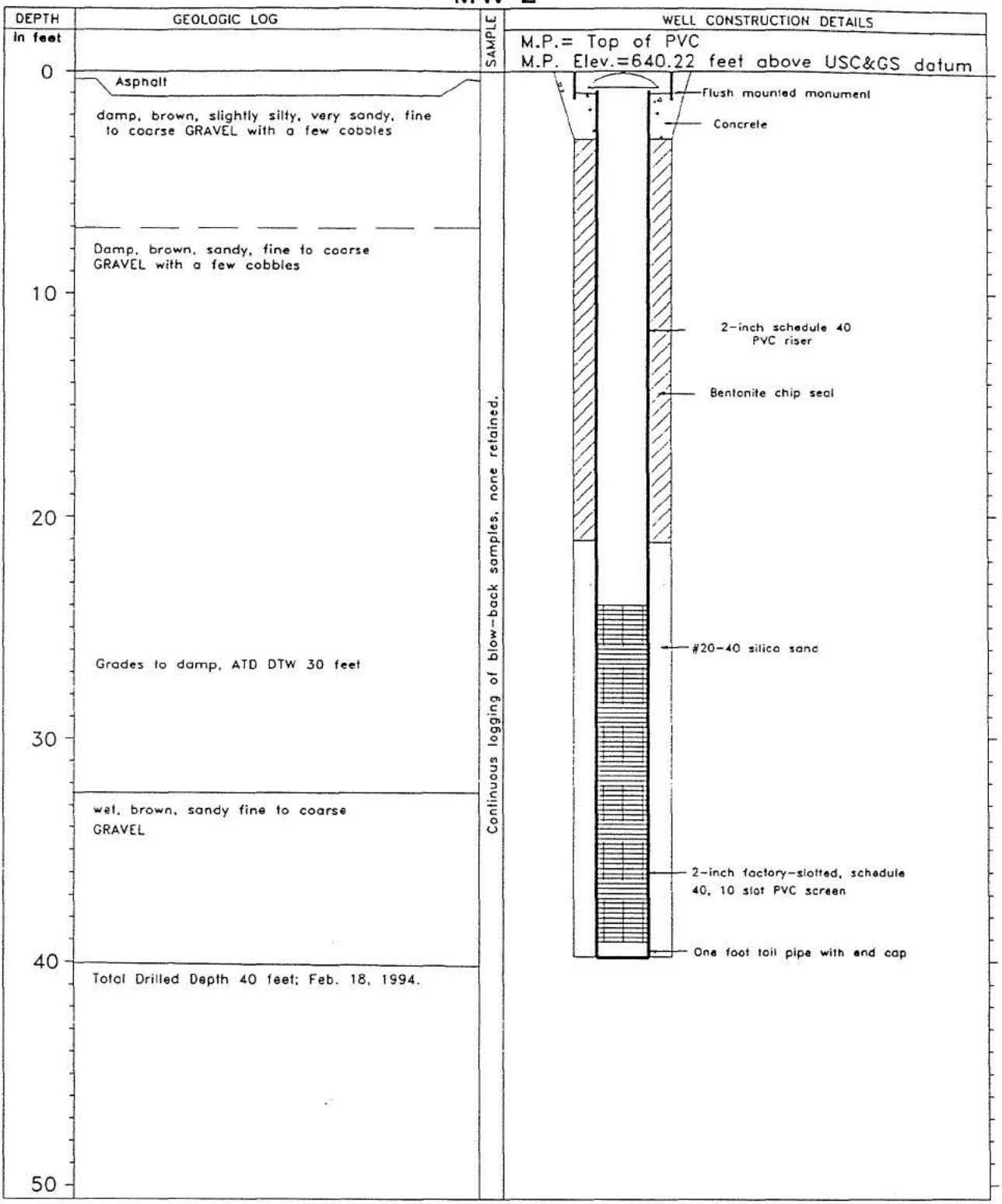
LOCATION: SW¼ NE¼ Sec 25 T22N R21E

DATUM: USC&GS Datum, 1947 Adjustment
WATER LEVEL ELEVATION: 611.79 feet
INSTALLED: Feb 17, 1994
DEVELOPED: Feb 18, 1994

Pacific Groundwater Group

AMER. SILICON TECH. MONITORING WELLS FOR CYPRUS-FOOTE

MW-2



* Sample Submitted for Grain Size Analysis

FIGURE A-3

PROJECT NAME: Amer. Silicon Tech. for Cyprus-Foote
WELL INDENTIFICATION NUMBER: MW-2
DRILLING METHOD: 6-inch TUBEX
DRILLER: Robert Sheldon
FIRM: Environmental West
CONSULTING FIRM: Pacific Groundwater Group, Inc.
REPRESENTATIVE: Chad Bring

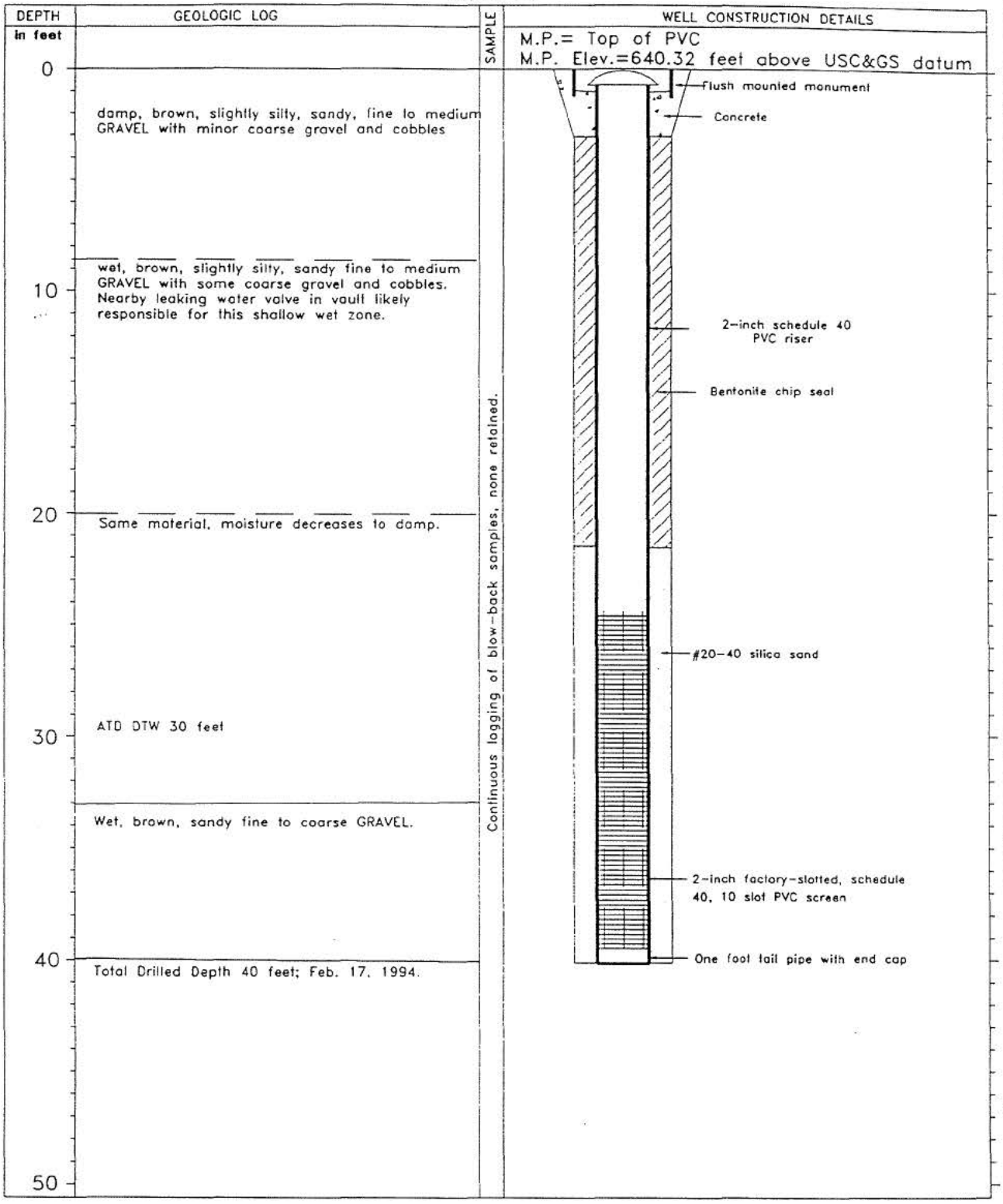
LOCATION: SW¼ NE¼ Sec 25 T22N R21E

DATUM: USC&GS Datum, 1947 Adjustment
WATER LEVEL ELEVATION: 611.42 feet
INSTALLED: Feb 18, 1994
DEVELOPED: Feb 18, 1994

Pacific Groundwater Group

AMER. SILICON TECH. MONITORING WELLS FOR CYPRUS-FOOTE

MW-3



* Sample Submitted for Grain Size Analysis

FIGURE A-4

PROJECT NAME: Amer. Silicon Tech. for Cyprus-Foote
WELL INDENTIFICATION NUMBER: MW-3
DRILLING METHOD: 6-inch TUBEX
DRILLER: Robert Sheldon
FIRM: Environmental West
CONSULTING FIRM: Pacific Groundwater Group, Inc.
REPRESENTATIVE: Chad Bring

LOCATION: SW¼ NE¼ Sec 25 T22N R21E

DATUM: USC&GS Datum, 1947 Adjustment
WATER LEVEL ELEVATION: 611.70 feet
INSTALLED: Feb 18, 1994
DEVELOPED: Feb 18, 1994

Pacific Groundwater Group

3902

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 011019

Water Right Permit No. A

(1) OWNER: Name Silicon MetalTech Inc Address PO Box 361 Wenatchee WA

(2) LOCATION OF WELL: County Douglas Gov Lot ¼ 2 ¼ Sec 25 T 22 N., R 21 W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) Rock Island WA

(3) PROPOSED USE: Domestic ☐ Industrial ☒ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐ DeWater ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) Replacement No 2

Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☒ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 20 inches. Drilled 105 feet. Depth of completed well 105 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 20 " Diam. from 0 ft. to 74 ft.
Welded ☒ Liner installed ☐ Threaded ☐ _____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnston
Type Tele Model No. _____
Diam. 18" Slot size 100 from 74 ft. to 105 ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal Grout (cement)
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 30 ft. below top of well Date 10-90
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

"	"	"	"
"	"	"	"

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Gravel	0	19
Sand + Gravel	19	71
Water Bearing Sand	71	105
Bed Rock	105	

Work started Sept 19 90 Completed Oct 19 90

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Ghessner Well Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address ST RT Box 55 Mansfield WA
(Signed) Albert Ghessner (WELL DRILLER) License No. 1372
Contractor's Registration No. _____ Date 10-13 19 90

(USE ADDITIONAL SHEETS IF NECESSARY)

APPENDIX B - LABORATORY ANALYSIS RECORDS AND DATA QUALITY REVIEW

Silicon Metaltech
JE9009.03

Quality Assurance/Quality Control Review
March 1, 1994

Upon receipt of the analytical results, a review of the Quality Assurance/Quality Control (QA/QC) data was performed to assess the validity of the analytical results. Analytical Resources Incorporated and Friedman & Bruya, Inc. were the analytical laboratories for this data set which included 4 groundwater samples. The samples sent to Analytical Resources, Inc. were unfiltered and filtered with a 10-micron filter, and therefore were analyzed for total and dissolved mercury, respectively. The samples sent to Friedman & Bruya were unfiltered split samples from the four wells sampled and therefore were analyzed for total mercury. The samples were collected on March 1, 1994.

In summary, the analytical results were found to be generally acceptable and complete with respect to QA/QC. The analytical results were generally found to meet standard QA/QC guidelines as set forth in *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses* (EPA, 1998). Therefore, no data qualifiers were assigned to the analytical results.

The following summarizes the findings of the QA/QC review:

1. Methodology: ACCEPTABLE

   Samples were analyzed using acceptable EPA method 7470 by cold vapor. The method was not specified on the Chain-of-Custody forms.

2. Holding Times: ACCEPTABLE

   The holding times were met for all analyses.

3. Matrix Spikes/Duplicate Matrix Spike (MS/DMS): ACCEPTABLE

   Matrix Spikes/Duplicate Matrix Spike (MS/DMS) are known concentrations of analytes added to one sample in 20 to check for matrix interferences in recovering the analyte from the sample matrix; the duplicate is then run to check analytical duplication. MS were run by both analytical laboratories. DMS was only run by Analytical Resources, Inc. This is found to be acceptable as the samples analyzed by Friedman & Bruya serve as field duplicates for those analyzed by Analytical Resources, Inc.

   The MS/DMS results indicate acceptable recovery of analytes and acceptable relative percent differences. The spike recoveries were within the acceptable ranges recommended by the acceptable criteria. The relative percent differences between MS and DMS were acceptable as it was 0%.

4. Method Blanks: ACCEPTABLE

Method Blanks were run by the laboratory to check for possible laboratory contamination. Blanks were analyzed for all analytes in all analytical batches at a rate of at least one in 20. No laboratory contamination was detected.

5. Method Detection Limits: ACCEPTABLE

The typical detection limit specified in the method 7470 was met by Friedman & Bruya, Inc. Analytical Resources, Inc. produced detection limits at least one order of magnitude lower than the detection limit specified in the method.

6. Field Duplicates: ACCEPTABLE

All four groundwater samples were analyzed by both laboratories as split samples for dissolved mercury. The analytical results indicate acceptable duplication; however, the detection limits were an order of magnitude different.

ANALYTICAL RESOURCES INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

11 March 1994

Charles Ellingson
Pacific Groundwater Group
2377 Eastlake Ave. East, Suite 200
Seattle, WA 98102

RE: Project No. JE9009.03;
ARI Job No. G555

Dear Mr. Ellingson,

Please fine enclosed the original chain-of-custody (COC) record and final results for the above referenced project. Four water samples were received intact on 3/2/94. There were no discrepancies between the COC and sample bottle labels, and the requested analyses for mercury proceeded without incident of note.

Sample **MW-1** was used as a matrix spike and sample **MW-3** was used as a duplicate, for QC for the "total" mercury analysis. Recovery and RPD reports are included as documentation.

A copy of this package, all raw data, and benchsheets will be kept on file with ARI should you require any further information or copies of any documentation. Also, if you have any questions, please feel free to call me any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

Kate Stegemoeller
Project Coordinator
206-340-2866, ext. 117

enc.

cc: file G555

Chain of Custody Record & Laboratory Analysis Request

G553

Date: 3/2/94

Page 1 of 1

Number of coolers: 1

ANALYTICAL RESOURCES INCORPORATED
333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ARI Client: Pacific Groundwater Group Phone #: 206-391-1411

Client Contact: Perry Ellingson

Client Project ID: JE9009.03

Samplers: Chad Allen Bring

	Sample ID	Date	Time	Matx	No Cont	Lab ID	Analysis Required: Metals Field Filtered Hg	Analysis Required: Metals Total Hg	Notes/Comments
1	MW-1	3/1/94	15:20	GW	2		1	1	
2	MW-3		16:25		2		1	1	
3	MW-2		17:20		2		1	1	
4	Pumping well		17:50		2		1	1	
5									
6									
7									

Comments/Special Instructions:

Relinquished by: (Signature)	Relinquished by: (Signature)	Relinquished by: (Signature)
Chad Allen Bring		
Printed Name: Chad Allen Bring	Printed Name:	Printed Name:
Company: PGG	Company:	Company:
Date: 3/2/94 Time: 16:05	Date: Time:	Date: Time:
Received by: (Signature)	**Received by: (Signature)**	**Received by: (Signature)**
Printed Name: DAN FELKINS	Printed Name:	Printed Name:
Company: ARI	Company:	Company:
Date: 3/2/94 Time: 16:05	Date: Time:	Date: Time:

EXPLANATION OF INORGANIC DATA REPORT CODES

The columns labeled 'PREP', 'C', and 'M' contain important information about your analyses. The codes are defined below.

PREPARATION CODES

These 3-letter codes describe methods used to prepare samples for analysis:

AEN USEPA, Metals in air filters
AHM ARI, Mercury in air filters
AHN ARI, Metals in air filters
ANN NIOSH 7300, Metals in air filters
CAN AOAC (1984) 25.024, Metals in earthenware
DE6 EPA 600/4-79-020 218.5, Cr(VI) in water
DMM DMN followed by TMM, Dissolved mercury
DMN Filtered through .45u filter, Dissolved metals
EW6 EWN followed by DE6
EWM EWN followed by TMM
EWN USEPA SW-846 1310, EP Toxicity
FHP ARI, Metals in tissue ($HNO_3/HClO_4$)
FPP PSEP, Metals in tissue ($HNO_3/HClO_4$)
FRM Journal, Mercury in tissue
FRN Journal, Metals in tissue (HNO_3/H_2O_2)
KRN ARI, Concentration by coprecipitation
LEM USEPA, TCLP followed by TMM
LEN USEPA, TCLP Extraction
MHM ARI, Mercury in miscellaneous materials
MHN ARI, Metals in miscellaneous materials
OAM ARI, Mercury in oil, grease or tar
OAN ARI, Metals in oil, grease or tar
PHM ARI, Mercury in wipes
PHN ARI, Metals in wipes
RCC USEPA CLP, Water digestion, HCl matrix
RCN USEPA CLP, Water digestion, HNO_3 matrix
REC EPA 600/4-79-020 4.1.4, HCl matrix
REI EPA 600/4-79-020 200.7 and 9.4
REN EPA 600/4-79-020 4.1.4, HNO_3 matrix
RMA EPA 600/4-79-020 206.2
RWC USEPA SW-846 3005
SCC USEPA CLP, Soil digestion, HCl matrix
SCM USEPA CLP, Mercury in soil
SCN USEPA CLP, Soil digestion, HNO_3 matrix
SEM EPA 600/4-79-020 245.5, Mercury in soil
SHF ARI, Metals in soil, HF digestion
SMN Agronomy,Metals in soil, Water extract
SMM SMN followed by DMM, Dissolved mercury
SSC Standard Methods 302C, Sb/Sn in soil
SSN Standard Methods 302C, Soil digestion
SSS Standard Methods 302C, Ti in soil
SW6 USEPA SW-846 3060, Cr(VI) in soil
SWC USEPA SW-846 3050, HCl matrix
SWN USEPA SW-846 3050, HNO_3 matrix
SWR USEPA SW-846 Modified 3005, Sb by GFAAS
TEC EPA 600/4-79-020 4.1.3, HCl matrix
TEG EPA 600/4-79-020 272.1, Silver in water
TEI EPA 600/4-79-020 200.7 and 9.3
TEN EPA 600/4-79-020 4.1.3, HNO_3 matrix
THG ARI, Silver in photographic solutions
TMM EPA 600/4-79-020 245.1, Mercury in water
TSC Standard Methods 302C, Sb/Sn in water
TSN Standard Methods 302D
TSS Standard Methods 302E, Ti in water
TWC USEPA SW-846 3010, HCl matrix
TWG USEPA SW-846 7760, Silver in water
TWN USEPA SW-846 3020, HNO_3 matrix
WMN EPA 600/4-79-020, Preserved, undigested water
XSC Standard Methods 302B

CONCENTRATION CODES

These codes are used to qualify reported concentrations:

U No analyte was detected. The reported value is the lower limit of detection.

METHOD CODES

These codes signify the instrumental technique used for analysis:

CVA Cold Vapor Atomic Absorption Spectrophotometry
FLA Flame Atomic Absorption Spectrophotometry
GFA Graphite Furnace Atomic Absorption Spectrophotometry
ICP Inductively Coupled Plasma Atomic Emission Spectrometry

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ARI job number: G555
ARI Sample number: E
Client: Pacific Groundwater
Contact: Pony Ellingson
Matrix: Water

% Solids: 0.00

ID number: MW-1
Project: JE9009.03
Description: Total Metals
Sampled: 03/01/94
Received: 03/02/94

Released by: _____

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	LOD	Prep	M	Analyzed
7439-97-6	Mercury	0.0005 mg/L		0.0001	TMM	CVA	03/09/94

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ARI job number: G555 **ID number:** MW-3
ARI Sample number: F Project: JE9009.03
Client: Pacific Groundwater Description: Total Metals
Contact: Pony Ellingson Sampled: 03/01/94
Matrix: Water Received: 03/02/94

% Solids: 0.00 Released by: _____

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	LOD	Prep	M	Analyzed
7439-97-6	Mercury	0.0001 mg/L	U	0.0001	TMM	CVA	03/09/94

ANALYTICAL
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Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ARI job number: G555 | **ID number:** MW-3
ARI Sample number: FDUP | Project: JE9009.03
Client: Pacific Groundwater | Description: Total Duplicate
Contact: Pony Ellingson | Sampled: 03/01/94
Matrix: Water | Received: 03/02/94

% Solids: 0.00 | Released by: _____

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	LOD	Prep	M	Analyzed
7439-97-6	Mercury	0.0001 mg/L	U	0.0001	TMM	CVA	03/09/94

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Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

Matrix Duplicate Quality Control Report

Client: Pacific Groundwater
Client's sample ID: MW-3
ARI sample ID: G555 FDUP
Units: mg/L

Analyte	Meth	Original Sample	Matrix Duplicate	RPD	Control Limit	Q
Mercury	CVA	U 0.0001	U 0.0001	0.0	±0.0001	L

RPD = Relative Percent Difference

'Q' codes: '*' = control limit not met
'L' = RPD not valid, alternate limit = ± detection limit

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Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ARI job number: G555
ARI Sample number: G
Client: Pacific Groundwater
Contact: Pony Ellingson
Matrix: Water

% Solids: 0.00

ID number: MW-2
Project: JE9009.03
Description: Total Metals
Sampled: 03/01/94
Received: 03/02/94

Released by: _____

ANALYTICAL RESULTS

CAS Number	Analyte	Concentration	C	LOD	Prep	M	Analyzed
7439-97-6	Mercury	0.0001 mg/L	U	0.0001	TMM	CVA	03/09/94

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ARI job number: G555
ARI Sample number: H
Client: Pacific Groundwater
Contact: Pony Ellingson
Matrix: Water

% Solids: 0.00

ID number: Pumping Well
Project: JE9009.03
Description: Total Metals
Sampled: 03/01/94
Received: 03/02/94

Released by: _____

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	LOD	Prep	M	Analyzed
7439-97-6	Mercury	0.0001 mg/L	U	0.0001	TMM	CVA	03/09/94

ANALYTICAL
RESOURCES
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Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ARI job number: G555
ARI Sample number: MB
Client: Pacific Groundwater
Contact: Pony Ellingson
Matrix: Water

% Solids: 0.00

ID number:
Project: JE9009.03
Description: Method Blank
Sampled: / /
Received: / /

Released by: _____

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	LOD	Prep	M	Analyzed
7439-97-6	Mercury	0.0001 mg/L	U	0.0001	TMM	CVA	03/09/94

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Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ARI job number: G555
ARI Sample number: A
Client: Pacific Groundwater
Contact: Pony Ellingson
Matrix: Water

% Solids: 0.00

ID number: MW-1
Project: JE9009.03
Description: Dissolved Metals
Sampled: 03/01/94
Received: 03/02/94

Released by: _____

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	LOD	Prep	M	Analyzed
7439-97-6	Mercury	0.0001 mg/L	U	0.0001	TMM	CVA	03/09/94

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Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ARI job number: G555
ARI Sample number: B
Client: Pacific Groundwater
Contact: Pony Ellingson
Matrix: Water

% Solids: 0.00

ID number: MW-3
Project: JE9009.03
Description: Dissolved Metals
Sampled: 03/01/94
Received: 03/02/94

Released by: _____

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	LOD	Prep	M	Analyzed
7439-97-6	Mercury	0.0001 mg/L	U	0.0001	TMM	CVA	03/09/94

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ARI job number: G555
ARI Sample number: C
Client: Pacific Groundwater
Contact: Pony Ellingson
Matrix: Water

% Solids: 0.00

ID number: MW-2
Project: JE9009.03
Description: Dissolved Metals
Sampled: 03/01/94
Received: 03/02/94

Released by: _____

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	LOD	Prep	M	Analyzed
7439-97-6	Mercury	0.0001 mg/L	U	0.0001	TMM	CVA	03/09/94

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ARI job number: G555
ARI Sample number: D
Client: Pacific Groundwater
Contact: Pony Ellingson
Matrix: Water

% Solids: 0.00

ID number: Pumping Well
Project: JE9009.03
Description: Dissolved Metals
Sampled: 03/01/94
Received: 03/02/94

Released by: _____

A N A L Y T I C A L R E S U L T S

CAS Number	Analyte	Concentration	C	LOD	Prep	M	Analyzed
7439-97-6	Mercury	0.0001 mg/L	U	0.0001	TMM	CVA	03/09/94

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Andrew John Friedman
James E. Bruya, Ph.D.
(206) 285-8282

3008-B 16th Avenue West
Seattle, WA 98119
FAX: (206) 283-5044

March 15, 1994

Charles Ellingson, Project Leader
Pacific Groundwater Group
2377 Eastlake Avenue East, #200
Seattle, WA 98102

Dear Mr. Ellingson:

Enclosed are the results from the testing of material submitted on March 3, 1994 from Project JE9009.03.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

Bradley T Benson

Bradley T. Benson
Chemist

BTB/dp

Enclosures

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: March 15, 1994
Date Received: March 3, 1994
Project: JE9009.03
Date Samples Extracted: March 4, 1994
Date Extracts Analyzed: March 4, 1994

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY BY COLD VAPOR

Results Reported as µg/L (ppb)

Sample ID	Mercury
MW-1	<2
MW-3	<2
MW-2	<2
Pumping Well	<2

Quality Assurance

Blank	<2
Pumping Well (Duplicate)	<2
Spike Blank % Recovery	120%
Spike Level	20

Chain of Custody Record & Laboratory Analysis Request

Date: 3/3/94

Page 1 of 1

Number of coolers: ____

ANALYTICAL RESOURCES INCORPORATED
333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ARI Client: Pacific Groundwater Group (PGG) Phone #: 621-6141

Client Contact: Andrea Ellingson

Client Project ID: JE9001.03

Samplers: Chad Allen Bruya

	Sample ID	Date	Time	Matx	No Cont	Lab ID
1	MW-1	3/1/94	15:20	GW	1	
2	MW-3		16:25		1	
3	MW-2		17:20		1	
4	Rinsate		17:50		1	
5						
6						
7						

Analysis Required: Total Petroleum Hydrocarbons as Gasoline, Benzene, Toluene, Ethylbenzene, Xylenes

Notes/Comments:
4>922
47923
47924
4>925

Comments/Special Instructions:

Relinquished by:	Relinquished by:	Relinquished by:
(Signature): Chad Allen Bruya	(Signature):	(Signature):
Printed Name: Chad Allen Bruya	Printed Name:	Printed Name:
Company: PGG	Company:	Company:
Date: 3/3/94 Time: 16:00	Date: Time:	Date: Time:
Received by:	**Received by:**	**Received by:**
(Signature):	(Signature):	(Signature):
Printed Name: Paul Pierce	Printed Name:	Printed Name:
Company: ARI	Company:	Company:
Date: 3/3/94 Time: 16:05	Date: Time:	Date: Time:

CYPRUS
Minerals Company

Cyprus Minerals Company
9100 East Mineral Circle
Post Office Box 3299
Englewood, Colorado 80155
303-643-5838

November 20, 1990

C. Corwin Bromley
Attorney

John Fahsholtz
State of Washington
Department of Ecology
3601 W. Washington
Yakima, Washington 98903

Designation of Stockpiled Material at Silicon Metaltech

Dear Mr. Fahsholtz:

This letter shall act as confirmation of our telephone conversation of Wednesday, November 14, 1990, in which we discussed the status of the stockpiled materials at the Silicon Metaltech, Inc. facility in Wenatchee, Washington.

As we discussed, I have received a copy of your letter to Mr. Charles Ellingson of Pacific Groundwater Group dated September 25, 1990, in which you expressed an opinion that it is probable some of the stockpiled material exceeds the regulatory threshold of 0.2 ppm for mercury. As I indicated, we feel that this position is not supported by the data and testing done to date.

Below I have set forth the reasoning for our position and our proposal for a more statistically sound method and scientific basis for determining whether any of the stockpiled materials should be designated as a Dangerous Waste under the Washington Department of Ecology regulations.

Background.

Based on the reports and testing performed by ERM-Northwest and Pat Wicks, soils under the old quality control laboratory were excavated and sampled on three separate dates: November 21, 1988, November 30, 1988 and December 9, 1988. The reports indicate that the first excavation involved a shallow trench of about 2 feet in depth, removing approximately 18 cubic yards (15 box containers). The November 30 and December 9 excavations expanded the trench to 6 feet and 10 feet in depth respectively, removing approximately 29 cubic yards (24 boxes) and 24 cubic yards (20 boxes) respectively.

As I indicated to you in our conversation, Pat Wicks has informed me he can identify the groups of containers which correspond to the three separate excavations. The point discussed during our July 27, 1990 meeting in Wenatchee, was the fact that the containers were not marked with identification such that he would be able to identify the individual boxes which correspond to the individual samples and lab results taken.

Sampling and lab analysis was performed for each of the three excavations. Four non-composite samples were taken during the November 21 excavation to initially identify if any contamination existed. Pat Wicks has informed me that these individual samples were taken where the physical evidence indicated the highest points of concentration would be located, and were not representative of the volume of material removed during the excavation. The laboratory results of these four samples indicated elevated levels of mercury at concentrations of 35, 1400, 4000 and 4000 mg/kg. No EP Toxicity tests were performed.

More extensive sampling was conducted during the November 30 excavation, obtaining 15 samples at the 3 foot and 6 foot depth levels, and EP Toxicity analysis was performed on the samples showing the highest mercury concentration levels. The results of this sampling is more representative of the entire volume removed at that time, and indicated mercury concentrations varying from 47 to 2370 mg/kg, and EP Toxicity ranging from 0.017 to 0.17 ppm (mg/L), with none exceeding the regulatory threshold of 0.2 ppm.

Four additional samples were taken during the December 9 excavation at the 10 foot depth level. The laboratory analysis on these samples indicated mercury concentrations of 16 to 110 mg/kg.

Characterization.

Results of EP Toxicity tests taken on representative samples of a volume of potentially mercury contaminated waste material are used to determine if the volume of waste should be designated as a Dangerous Waste under the WDOE regulations. The EP Toxicity test results on the stockpiled material show that, at least for the second excavation, the material does not exceed the regulatory threshold of 0.2 ppm, and thus should not be designated as a Dangerous Waste. Although it could be argued that by extrapolation of EP Toxicity and total mercury concentration data correlation, the two 4000 ppm concentration test results from the November 21 excavation might result in a EP Toxicity in excess of 0.2 ppm, the use of such extrapolation would not be proper or have a sound scientific or statistical basis to determine whether the material should be designated as a Dangerous Waste.

First, the two individual samples showing concentrations of 4000 mg/kg are not representative samples of the volume of material to be designated. As was stated earlier, the four individual trench samples obtained during the November 21 excavation were taken where the physical evidence indicated the highest points of concentration would be located, and as such are only representative only of the isolated point where they are taken and not representative of the total volume or even a practical subdivision of the material removed during the excavation. Using single point tests, without compositing, as being representative of a volume of material, is scientifically indefensible and will lead only to erroneous conclusions. The erroneous results of using single point samples in this method can be illustrated by the following examples: if one sampled only one tree in a section of forest, and that tree had an eagles nest in it, using this tree as a representative sample of the section of forest would indicate that every tree in the section would have an eagles nest in it; or if one took a single sample from a brightly colored portion of a large rock outcrop, and analysis of the sample showed a concentration of 20% gold, use of this single sample as representative of the whole outcrop would indicate it is all 20% gold. Both examples evidence how single point tests are representative only of the isolated item, and do not represent a larger unit. Accordingly, the use of the individual test results is an improper basis for designating all or a practical portion of the stockpiled material. Rather, if the four November 21 test results are used for extrapolation for EP Toxicity, they should be composited, which would result in an average concentration of 2359 mg/kg. When compared to the November 30 tests which correlated the maximum concentration of 2370 mg/kg with an EP Toxicity of 0.1 ppm and a concentration of 1300 mg/kg with an EP Toxicity of 0.17 ppm, the extrapolation for the November 21 excavation would likewise be less than the regulatory threshold of 0.2 ppm.

Secondly, Washington's Dangerous Waste regulations also recognize that designation of wastes must use proper representative samples of the waste in question. WAC § 173-303-110 sets forth the approved testing methods which can be used in the process of designating a Dangerous Waste and the approved methods of obtaining a representative sample of the subject waste. Samples taken pursuant to ASTM Standard D420-69 (the most recent edition titled D420-89) for soil or rock like material are considered by the regulations to be representative samples of the waste. ASTM Standard D75 - Appendix X3, as referenced in D420, sets forth the recommended practice for determining the number and size of increments needed to estimate the character of the unit sampled (these ASTM Standards are attached for your convenience). Appendix X3 contemplates evaluation of a practical volume of material (a unit) which is to be characterized by a field sample. The field sample in turn consists of a composite of "three or more increments [or samples] chosen at random from the

EEC

Work Detail for project 39261

04-Dec-95	**Project management**
05-Dec-95	**Project management**
07-Dec-95	**Telephone call to Doug Morrison re: storm water permit application**

CHARACTERIZATION OF MERCURY IN SOIL AND FILL AT SILICON METALTECH, INC. Rock Island, Washington

March 9, 1989

Patrick H. Wicks, PE, CHMM
Consultant

Mark C. Menard, CHWS, REA
Project Manager

Prepared for:
SILICON METALTECH, INC.
Seattle, Washington

Prepared by:
ERM-Northwest, Inc.
2535 152nd Avenue NE, Suite B2
Redmond, Washington 98052
(206) 885-1787

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1 INTRODUCTION

Silicon Metaltech, Inc. (SMI) of Seattle, Washington requested ERM-Northwest, Inc. (ERM-NW) in late November 1988 to investigate mercury in soil and fill near the former quality control lab at its facility located in Rock Island, Washington (see Figure 1).

The SMI Rock Island facility was formerly owned by the M. A. Hanna Company-Silicon Division and was purchased by SMI in August, 1988.

This report will serve to relate activities undertaken and findings reached to date for this investigation and during previous work near the former quality control lab in August 1988. The approximate location of the subject facilities is shown in Figures 2a and 2b. More specific sample location are shown in other figures. All analytical laboratory data and sample chain of custody forms are provided in the Appendix.

All excavation and sampling activities described below were conducted under the supervision of ERM-NW.

2 CHARACTERIZATION DESCRIPTION

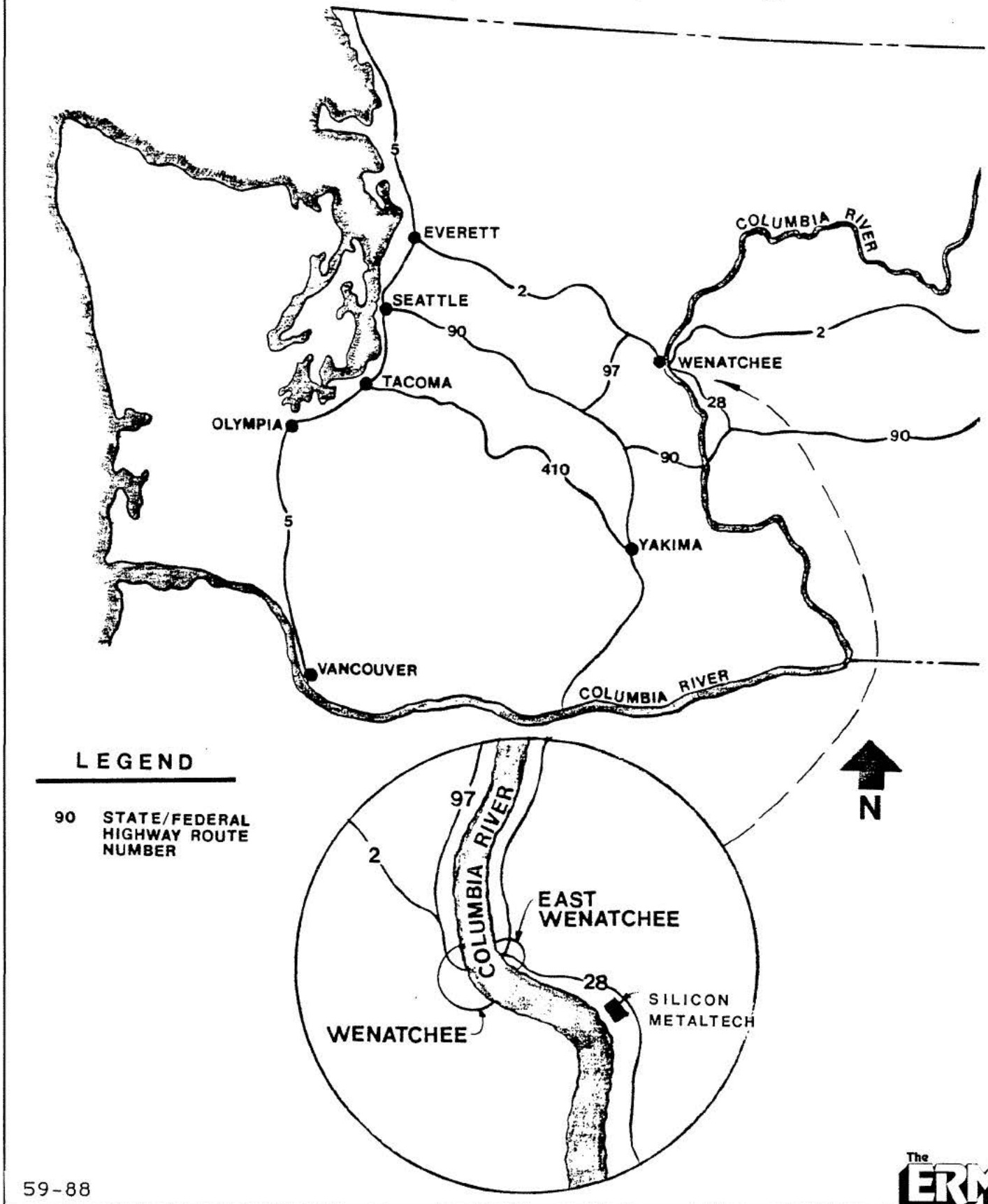
The laboratory dry well was previously identified as the primary recipient of laboratory liquid wastes such as spent reagents and wash waters. The discharges released into this dry well (which apparently consisted of a buried pipe draining into the gravelly subsoil) may have been responsible for the release of hazardous materials into the environment.

In order to determine the potential for such releases, a shallow pit was excavated with a backhoe on August 23, 1988. The pit was excavated to a depth of approximately 36 inches, where moisture in the soil indicated that the discharge area of the drain pipe had been reached (see Figure 3a for the approximate location). A grab sample was taken at the 36 inch depth and placed in several glass jars provided for that purpose by Lauck's Testing Laboratories of Seattle.

The analyses requested for these samples included all Priority Pollutants, including metals, PCBs, pesticides and other organic compounds. The samples were delivered to the analytical laboratory within 16 hours after collection. Results of the analyses are reported in Section 3.1.

Several months after purchasing the plant, SMI demolished the quality control lab in preparation for the construction of a new laboratory structure. ERM-NW was advised by plant personnel at the time of the demolition (November 1988) that mercury had been used in the quality control laboratory until the mid to late 1960's. Based upon this revelation, a decision was made to collect and analyze samples of soils from beneath

Figure 1
Site Location Map
Silicon Metaltech, Rock Island, Washington

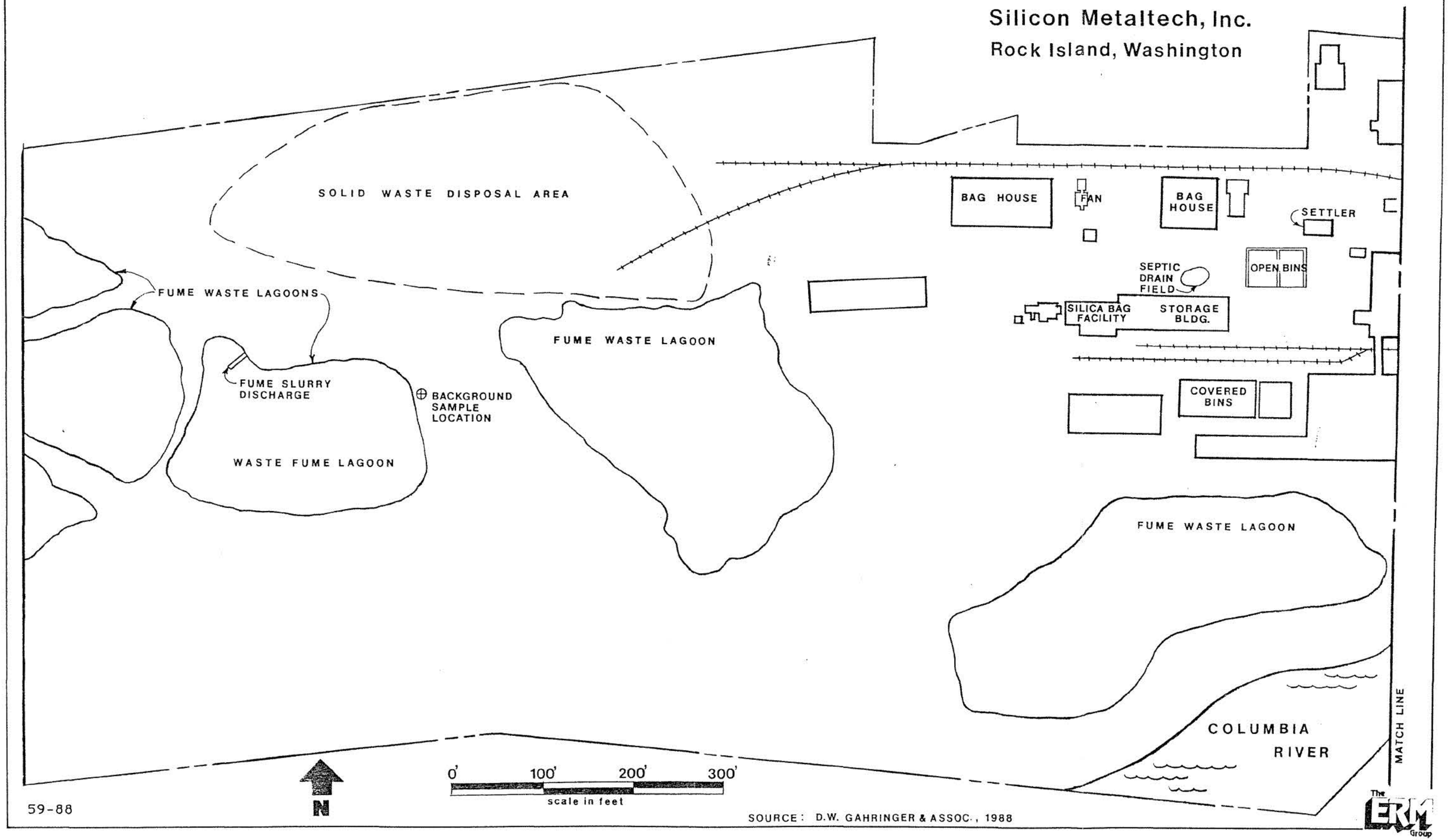


59-88

Figure 2a

Silicon Metaltech, Inc.

Rock Island, Washington



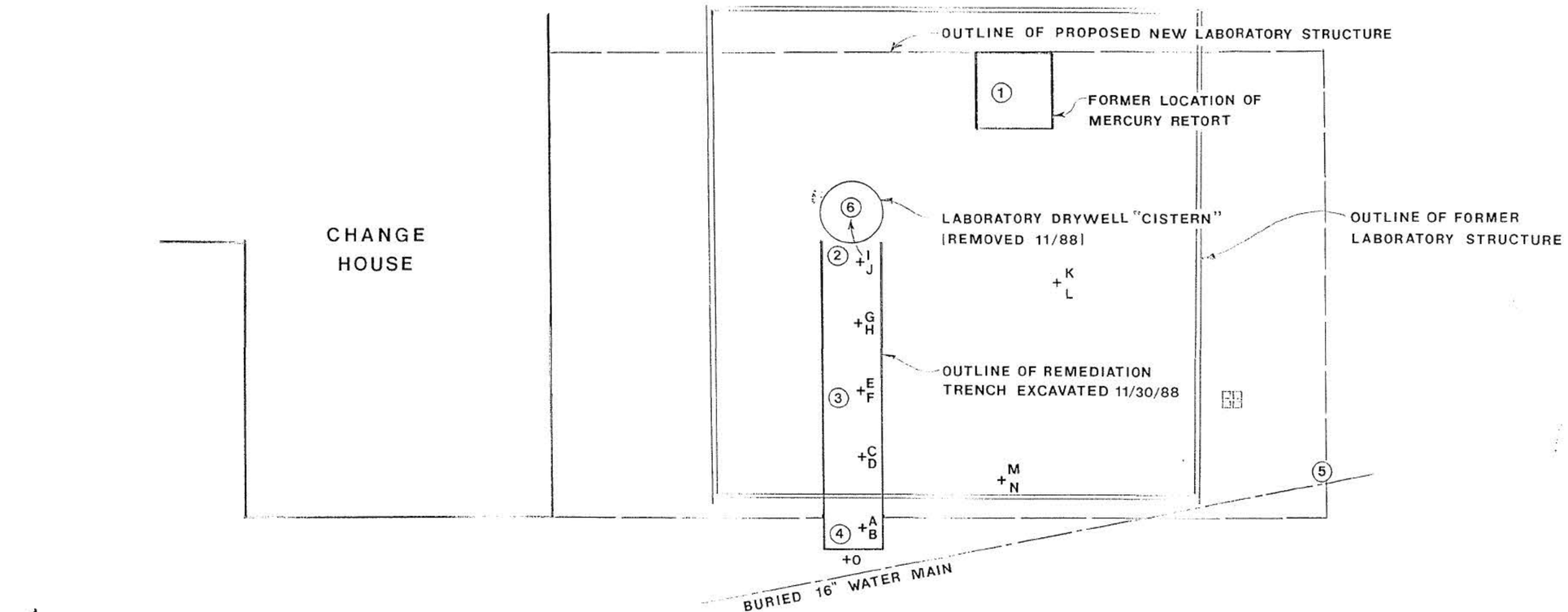
59-88

SOURCE: D.W. GAHRINGER & ASSOC., 1988

Figure 2b
Silicon Metaltech, Inc.
Rock Island, Washington

#3 WELL
#2 WELL
SHOPS & ELECT.
CHANGE HSE.
LAB
OFFICE
DRY WELL
SEPTIC DRAIN FIELD
TRANSFORMER
RAW MATERIALS BLDG.
IRON SHREDDER
4
3
2
1
FURNACE BLDG.
FUEL TANK
COOLING WATER OUTFALL
COLUMBIA RIVER
MATCH LINE
N
0'
100'
200'
300'
scale in feet
59-88
SOURCE: D.W. GAHRINGER & ASSOC., 1988
The ERM Group

Figure 3a
Silicon Metaltech, Inc.
Laboratory Drywell Investigation
Rock Island, Washington



LEGEND

① SOIL SAMPLE LOCATIONS 11/21/88

+I J SOIL SAMPLE LOCATIONS 11/30/88

SOIL SAMPLE LOCATION 8/24/88

0' 2' 4' 6' 8' 10'

scale in feet

59-88

The ERM Group

the former location of the laboratory. Sampling of the soil was conducted on November 21. The samples were obtained with the use of SMI's backhoe and personnel under the direction of an ERM-NW geologist. A shallow trench was excavated where shown in Figure 3a.

Six samples were collected on November 21. The bucket of the backhoe was steam cleaned before the start of sampling and between sample locations. All sampling trowels, spatulas, and other equipment was either cleaned between sample points or disposed of following use at an individual point. Of the six samples collected November 21, samples 2, 3, and 4 were collected around a clay pipe found to extend westward from a two-foot diameter vertical cement pipe identified as the quality control laboratory dry well "cistern" by site maintenance and laboratory personnel. The clay pipe appeared to have evidently been lain atop a layer of gray sandy backfill, as this sand was found consistently beneath the clay pipe. The sandy backfill material was different in appearance and texture from the brown gravelly native soil.

Sample 1 was collected from native soil in an area underlying the former location of the laboratory mercury retort, as identified by maintenance personnel. Sample 5 was collected from an area identified as being within the discharge area of the dry well drain. Sample 6 was collected from within the vertical cement pipe identified as the laboratory dry well cistern. This sample appeared to consist mainly of crushed silicon metal.

The samples were placed in a cooler and delivered to a laboratory in California within 36 hours of collection. A sample chain of custody form was prepared and shipped with the cooler. The samples were analyzed for lead, mercury, cadmium, chromium, copper, and nickel. The results of the analyses are reported in Section 3.2.

Based on the elevated mercury levels and the somewhat elevated concentrations of lead detected in some of the November 21 samples, it was decided to undertake a remediation of the area in an effort to clean up and dispose of contaminated soils. To that end, the above referenced clay drain pipe was excavated on November 30. The drain pipe was removed and placed in wooden crates lined with plastic along with approximately thirteen cubic yards of surrounding soil. This excavation created a trench with the approximate dimensions shown in Figure 3a, i.e., three feet deep, four feet wide, and 20 feet long. Immediately following the excavation, samples were collected at depths of one foot and three feet below the bottom of the trench at each of the locations designated in Figure 3a. The samples were collected at the one foot level directly from the trench. The samples from the three foot level were gathered from the bucket of the backhoe, due to safety considerations. The bucket was steam cleaned between each sampling.

The samples were placed in an insulated cooler and delivered to a laboratory in California via air freight within 24 hours of collection. A sample chain of custody form

was prepared and shipped with the cooler. The samples were analyzed for lead and mercury. The results of the analyses are reported in Section 3.3.

The results of the November 30 sampling and analysis indicated that the excavation undertaken up to that time had not reached the boundary of the mercury contamination. Additional excavation and sampling was therefore indicated. This took place on December 9.

The additional excavation on December 9 resulted in expanding the trench, as indicated in plan view in Figure 3b and in cross section in Figure 3c. The dimensions of the trench were approximately nine feet deep, ten feet wide, and thirty feet long. Immediately following the excavation, samples were collected at a depth of one foot below the bottom of the trench at each of the locations designated in Figures 3b and 3c. The samples were collected from the bucket of the backhoe, due to safety considerations.

The samples were placed in an insulated container and delivered to Central Coast Analytical Laboratories via air freight within 16 hours of collection. A sample chain of custody form was prepared and shipped with the container.

The samples collected on December 9 were analyzed for total mercury. The results are discussed in Section 3.4.

3 CHARACTERIZATION RESULTS

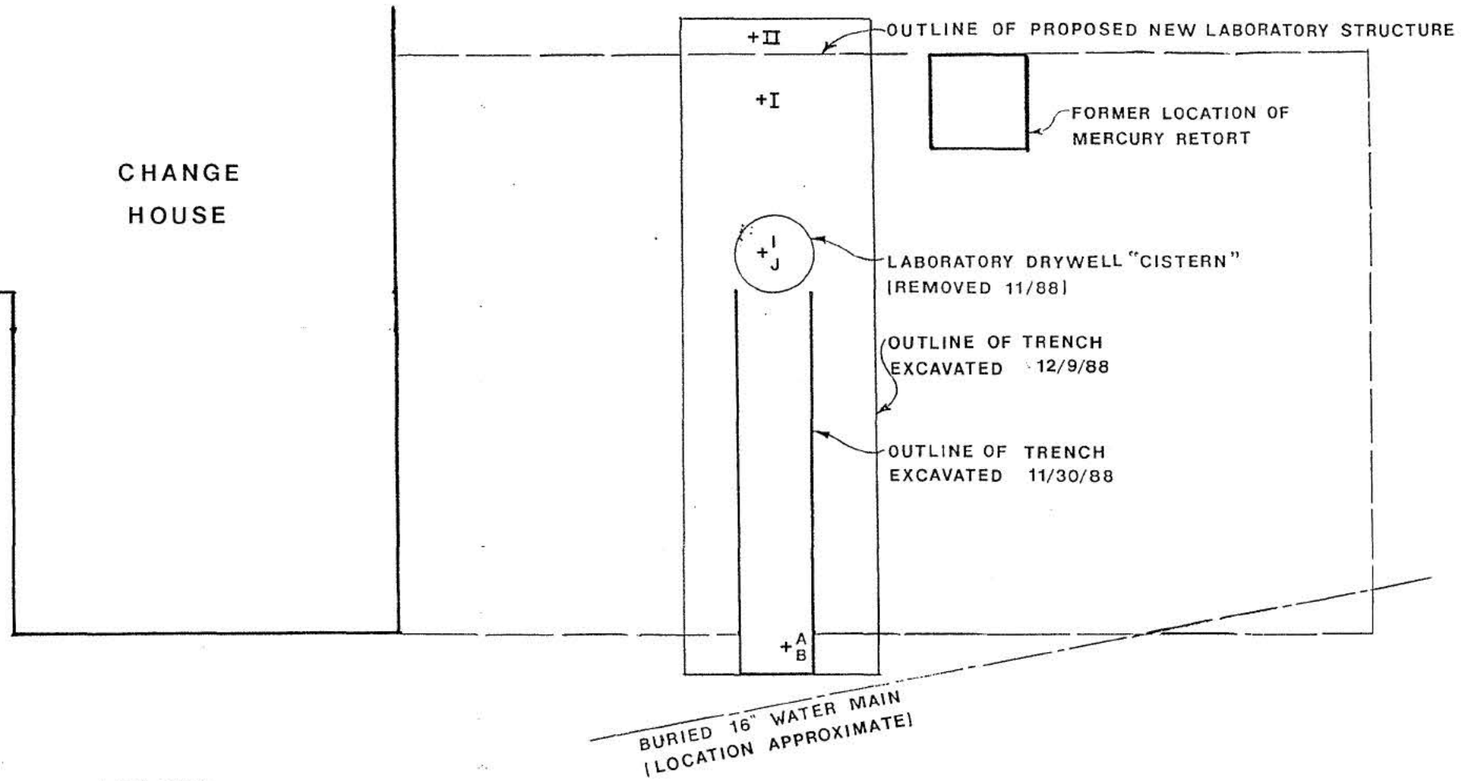
3.1 August 23 Samples

The results of the analysis of the August 23 soil sample collected from the dry well servicing the Silicon Metaltech quality control laboratory are summarized in Table 1. Because there are no records concerning the history of waste disposal via this drain, the sample was analyzed for all Priority Pollutants. The sample was analyzed in accordance with "Test Methods for Evaluating Solid Waste", (SW 846), U.S.E.P.A., 1986, utilizing Method 9010 for cyanide; Method 8240 for volatile organics; Method 8270 for semi-volatile extractables; and Method 8080 for pesticides and PCBs. Phenol analysis was in accordance with Method 402.2, "Methods for Chemical Analysis of Water and Wastes", U.S.E.P.A., March, 1983.

The analytical data for these samples are summarized in Table 1. Only two organic compounds were detected through the above analyses, both of them phthalates: di-n-butyl phthalate and bis(2-ethylhexyl)phthalate, at concentrations of 190 and 100 parts per billion (ppb), respectively.

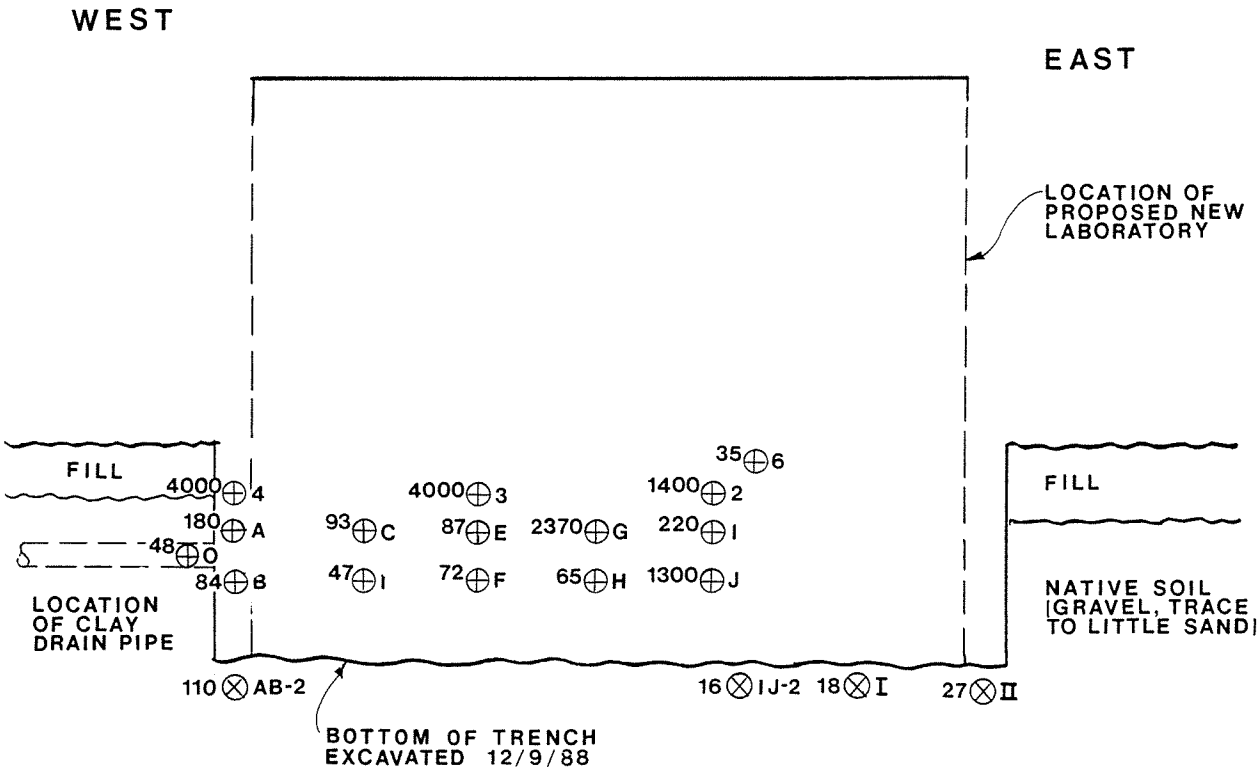
Results of the analysis of the August 23 laboratory dry well sample for the priority pollutant metals indicate that these metals were not present in concentrations which

Figure 3b
Silicon Metaltech, Inc.
Laboratory Drywell Investigation
Rock Island, Washington



59-88

Figure 3c
Silicon Metaltech, Inc.
Laboratory Drywell Investigation
Rock Island, Washington



LEGEND

⊕AB-2 SAMPLE LOCATIONS 12/9/88

110 TOTAL MERCURY CONCENTRATION, PPM, AT DESIGNATED SAMPLE LOCATION

⊕6 SAMPLE LOCATIONS 11/21/88

⊕A SAMPLE LOCATIONS 11/30/88

0' 2' 4' 6' 8' 10'

scale in feet

59-88

The ERM Group

give cause for concern. Lead was detected at a level of 16 ppm and mercury at less than 0.1 ppm. These data are shown in Table 1.

3.2 November 21 Samples

The November 21 sampling results show that samples 2, 3, 4, and 6 exhibited elevated levels of mercury, ranging from 35 to 4000 ppm, and somewhat elevated levels of lead, ranging up to 160 ppm. Samples 1 and 5 did not have elevated total mercury and total lead concentrations. Samples 2, 3, and 4 were collected from immediately around the clay drain pipe which extends westward from the cement cistern structure. These three samples consisted of fine to medium-grained soils which were light gray-brown in appearance and were moist to wet. Sample 6 was collected from the inside of the cistern and had the texture and appearance of ground silicon metal with a trace of soil. Samples 1 and 5 were collected from a soil horizon which appeared to be weathered native material. These data are shown in Table 1.

These analytic results suggest that the elevated mercury concentration was present in a zone along the clay drain pipe. Further sample collection and analysis was apparently needed to characterize the extent of contamination.

3.3 November 30 Samples

The above referenced clay drain pipe was excavated on November 30. Approximately thirty linear feet of the pipe was removed and placed in wooden crates lined with plastic along with approximately thirteen cubic yards of surrounding soil. Excavation of the pipe and soil was halted when it became apparent that the excavation was nearing the sixteen inch diameter water main which services the silicon smelter's furnaces. The clay pipe did appear to extend further to the west, beyond the excavated trench. Immediately following the excavation, samples were collected at depths of one foot and three feet beneath the bottom of the trench at each of the sample points. The sample locations are show in Figures 3b and 3c.

These samples were analyzed for total lead and total mercury content. The soil samples collected from areas immediately underlying the former location of the laboratory drain line had values of over 45 ppm total mercury, with a range of 47 ppm to 2370 ppm mercury. The values of lead ranged from 14 ppm to 160 ppm in the same zone. Samples collected from areas lying further out from the location of the clay drain line were also analyzed for total lead and mercury, as a check to ensure that contamination was not more widespread than originally thought. These samples (Lab K through Lab N, shown as K through N on Figure 3a), had total lead values ranging from 2 to 6 ppm, and total mercury values ranging for 0.072 to 1.2 ppm (see Table 1). These values were close to the background lead and mercury concentrations determined in a sample collected on the SMI property.

The samples which exhibited the highest levels of total lead and mercury (samples A,D,C,I, and J) were further subjected to an EP Toxicity method analysis. The EP Toxicity method is used to determine the hazardous waste characteristic of a contaminated substance in regard to several metallic elements and pesticides, in accordance with WDOE dangerous waste regulations.

The procedure is indicative of the relative solubility and mobility of a substance under conditions perhaps more closely approaching those found in natural systems than the acid digestion used for the total metals analysis. The results of the EP Toxicity analysis indicated that the mercury and lead present in the soils at the former site of the laboratory are of low solubility. The levels of extractable mercury ranged from 0.017 ppm to 0.17 ppm. Levels of lead were present in amounts which were not detectable with the detection method utilized, with a detection limit of 0.02 ppm. None of these values exceed the regulatory thresholds of 0.2 ppm for mercury and 5 ppm for lead.

The results of the November 30 sampling and analysis were encouraging in that it was determined that:

(1) the extent of contamination was limited horizontally (i.e., apparently limited to a zone around the former drain pipe);

(2) the mercury present was present in a form which was of low relative solubility; and

(3) lead was not present in concentration levels which would cause concern.

However, the total levels of mercury remaining were still of concern. Additional excavation of contaminated soil, followed by sampling of the underlying material was therefore indicated. This took place on December 9, 1988.

3.4 December 9 Samples

The December 9 sampling points were selected to lie beneath those areas which had exhibited the highest concentrations of mercury during the November 30 sampling or in previously unsampled locations lying further to the east from the November 30 samples. The samples collected on December 9 were analyzed for total mercury.

Results of the analyses performed on the December 9 samples indicated that some trace levels of mercury persist in the soil underlying the former location of the SMI laboratory, but that these levels are much diminished when compared to the concentrations encountered at shallower depths along the former drain pipe. The four samples had levels of 110, 16, 18, and 27 ppm of total mercury (see Figure 3c). The highest concentration of mercury was found in the sample closest to the west end of the trench, where excavation was halted due to the proximity of a large water main.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Contaminant Levels

The initial (August 1988) sample collected from the laboratory dry well disposal area exhibited no elevated concentrations of priority pollutant metals. Mercury was found at a level of less than 0.1 ppm. Lead was detected at a concentration of 13 ppm. Two organic compounds were detected, both of which were phthalates. These are compounds present in many plastics and appear occasionally in environmental samples. They are thought to be due to laboratory or sampling contamination.

Samples collected on November 21, November 30 and December 9 indicate that some soil or fill is contaminated with mercury in the area underlying the former quality control laboratory. This contamination appears to be limited to a zone lying along the clay drain extending from the laboratory cistern. Further remediation of this site to reduce mercury levels is recommended. This should consist of removal of the contaminated soil and testing of the underlying soils for total mercury content.

Mercury has not been used at the plant quality control laboratory in significant quantities for over 20 years. The mercury found in soil or fill near the former quality control laboratory does not appear to be the result of an ongoing release to the environment.

4.2 Regulatory Compliance

The Washington Department of Ecology (WDOE) was contacted in late November 1988 by ERM-NW to advise of the elevated mercury levels found and to discuss remediation guidelines. WDOE representatives visited the site December 15 and inspected the area of the former quality control laboratory and the storage containers for the mercury contaminated soil/fill that had been excavated from the former lab area. Analytic data for the subject soils and fill were also reviewed with WDOE representative at that time.

In our engineering judgment, reporting of these conditions to the WDOE was required by WAC 173 303 145. Engineering plans to remediate the former quality control laboratory area are presently being prepared.

APPENDIX

TABLE 1. SUMMARY OF QUALITY CONTROL LAB ANALYTIC DATA

Constituent Concentration, parts per million (ppm, mg/l, mg/kg)

Sample Location	lab-1	SM1(11)-1	SM1(11)-2	SM1(11)-3	SM1(11)-4	SM1(11)-5	SM1(11)-6	Lab A	Lab B	Lab C	Lab D	Lab E	Lab F	Lab G
Sample Identification	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well
Sample Date	24-Aug 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88
Sample Type	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Sample Depth, Ft	3	2	1.5	2	2	3	1	3	6	3	6	3	6	3
Laboratory	Laucks	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS
Report Number or Date	11678	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88
Laboratory Sample Number	3	E-12,163	E-12,164	E-12,165	E-12,166	E-12,167	E-12,168	E-12,381	E-12,382	E-12,383	E-12,384	E-12,385	E-12,386	E-12,387
PRIORITY POLLUTANTS														
METALS														
Antimony	<0.5													
Arsenic	3.1													
Beryllium	0.4													
Cadmium	<0.5	<0.3	<.3	0.3	<.3	<.3	1.9							
Chromium	25.	1.6	6	34	11	21	93							
Copper	19.	22	11	17	26	57	27							
Lead	13.	<.1	150	46	68	31	35	36	14	41	37	25	21	61
Mercury	<0.1	13	1400	4000	4000	1.4	35	180	84	93	47	87	72	2370
Nickel	16.	16	<3	6	5	22	23							
Selenium	<5.													
Silver	<1.													
Thallium	<0.5													
Zinc	62.													
MISCELLANEOUS														
Total Phenol	<0.0005													
Total Cyanide	<0.0005													
BASE-NEUTRAL EXTRACTABLES														
Acenaphthene	<0.037													
Acenaphthylene	<0.037													
Anthracene	<0.037													
Benzidine	<0.93													
Benzo(a)anthracene	<0.037													
Benzo(a)pyrene	<0.074													
Benzo(b)fluoranthene	<0.074													
Benzo(ghi)perylene	<0.074													
Bis(2-chloroethoxyl) methane	<0.037													
Bis(2-chloroethyl) ether	<0.037													
Bis(2-chloroisopropyl) ether	<0.037													
Bis(2-ethylhexyl) phthalate	0.1													
4-Bromophenyl phenyl ether	<0.074													
Butyl benzyl phthalate	<0.037													
2-Chloronaphthalene	<0.037													
Chrysene	<0.037													
4-Chlorophenyl phenyl ether	<0.037													

TABLE 1. SUMMARY OF QUALITY CONTROL LAB ANALYTIC DATA

Constituent Concentration, parts per million (ppm, mg/l, mg/kg)

Sample Location	lab-1	SM1(11)-1	SM1(11)-2	SM1(11)-3	SM1(11)-4	SM1(11)-5	SM1(11)-6	Lab A	Lab B	Lab C	Lab D	Lab E	Lab F	Lab G
Sample Identification	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well
Sample Date	24-Aug 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88
Sample Type	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Sample Depth, Ft	3	2	1.5	2	2	3	1	3	6	3	6	3	6	3
Laboratory	Laucks	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS
Report Number or Date	11678	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88
Laboratory Sample Number	3	E-12,163	E-12,164	E-12,165	E-12,166	E-12,167	E-12,168	E-12,381	E-12,382	E-12,383	E-12,384	E-12,385	E-12,386	E-12,387
Dibenzo(a,h)anthracene	<0.074													
1,2-Dichlorobenzene	<0.037													
1,3-Dichlorobenzene	<0.037													
1,4-Dichlorobenzene	<0.037													
3,3-Dichlorobenzidine	<0.37													
Diethyl phthalate	<0.037													
Dimethyl phthalate	<0.037													
Di-n-Butyl phthalate	0.19													
2,4-Dinitrotoluene	<0.074													
2,6-Dinitrotoluene	<0.074													
Di-n-octyl phthalate	<0.037													
1,2-Diphenylhydrazine	<0.074													
Fluoranthene	<0.037													
Fluorene	<0.037													
Hexachlorobenzene	<0.074													
Hexachlorobutadiene	<0.037													
Hexachlorocyclopentadiene	<0.074													
Hexachloroethane	<0.074													
Indeno(1,2,3-cd)pyrene	<0.074													
Isophorone	<0.037													
Napthalene	<0.074													
Nitrobenzene	<0.037													
N-nitrosodi-n-propylamine	<0.037													
N-Nitrosodiphenylamine	<0.037													
Phenanthrene	<0.037													
Pyrene	<0.037													
1,2,4-Trichlorobenzene	<0.037													
ACID EXTRACTABLES														
2-Chlorophenol	<0.037													
2,4-Dichlorophenol	<0.074													
2,4-Dimethylphenol	<0.037													
4,6-Dinitro-o-cresol	<0.47													
2,4-Dinitrophenol	<0.37													
2-Nitrophenol	<0.074													
4-Nitrophenol	<0.37													
p-Chloro-m-cresol	<0.074													
Pentachlorophenol	<0.37													

TABLE 1. SUMMARY OF QUALITY CONTROL LAB ANALYTIC DATA

Constituent Concentration, parts per million (ppm, mg/l, mg/kg)

Sample Location	lab-1	SM1(11)-1	SM1(11)-2	SM1(11)-3	SM1(11)-4	SM1(11)-5	SM1(11)-6	Lab A	Lab B	Lab C	Lab D	Lab E	Lab F	Lab G
Sample Identification	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well
Sample Date	24-Aug 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88
Sample Type	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Sample Depth, Ft	3	2	1.5	2	2	3	1	3	6	3	6	3	6	3
Laboratory	Laucks	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS
Report Number or Date	11678	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88
Laboratory Sample Number	3	E-12,163	E-12,164	E-12,165	E-12,166	E-12,167	E-12,168	E-12,381	E-12,382	E-12,383	E-12,384	E-12,385	E-12,386	E-12,387
Phenol	<0.037													
2,4,6-Trichlorophenol	<0.074													
PESTICIDES/PCBs														
Aldrin	<0.008													
a-BHC	<0.008													
b-BHC	<0.008													
g-BHC (lindane)	<0.008													
d-BHC	<0.008													
Chlordane	<0.16													
4,4-DDD	<0.016													
4,4-DDE	<0.016													
4,4-DDT	<0.016													
Dieldrin	<0.016													
a-Endosulfan	<0.008													
b-Endosulfan	<0.016													
Endosulfan sulfate	<0.016													
Endrin	<0.016													
Endrin aldehyde/ketone	<0.032													
Heptachlor	<0.008													
Heptachlor epoxide	<0.008													
PCB-1016	<0.08													
PCB-1221	<0.08													
PCB-1232	<0.08													
PCB-1242	<0.08													
PCB-1248	<0.08													
PCB-1254	<0.16													
PCB-1260	<0.16													
Toxaphene	<0.16													
TOTAL PCBs (By EPA method 8080)														
VOLATILES ORGANICS														
Bromodichloromethane	<0.001													
Bromoform	<0.001													
Bromomethane (Methyl bromide)	<0.001													
Carbon tetrachloride	<0.001													
Chlorobenzene	<0.003													
Chloroethane	<0.003													

TABLE 1. SUMMARY OF QUALITY CONTROL LAB ANALYTIC DATA

Constituent Concentration, parts per million (ppm, mg/l, mg/kg)

Sample Location	lab-1	SM1(11)-1	SM1(11)-2	SM1(11)-3	SM1(11)-4	SM1(11)-5	SM1(11)-6	Lab A	Lab B	Lab C	Lab D	Lab E	Lab F	Lab G
Sample Identification	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well
Sample Date	24-Aug 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88
Sample Type	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Sample Depth, Ft	3	2	1.5	2	2	3	1	3	6	3	6	3	6	3
Laboratory	Laucks	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS
Report Number or Date	11678	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88
Laboratory Sample Number	3	E-12,163	E-12,164	E-12,165	E-12,166	E-12,167	E-12,168	E-12,381	E-12,382	E-12,383	E-12,384	E-12,385	E-12,386	E-12,387
2-Chloroethylvinyl ether														
Chloroform (Trichloromethane)	<0.001													
Chloromethane	<0.001													
Dibromochloromethane	<0.003													
1,1-Dichloroethane	<0.001													
1,2-Dichloroethane	<0.001													
1,1-Dichloroethylene	<0.001													
1,2-Dichloropropane	<0.001													
1,3-Dichloropropylene (cs&ts)	<0.006													
Ethylbenzene	<0.001													
Methylene chloride	<0.001													
1,1,2,2-Tetrachloroethane	<0.003													
Tetrachloroethylene	<0.001													
1,2-trans-Dichloroethylene	<0.001													
1,1,2-Trichloroethane	<0.001													
Trichloroethylene (TCE)	<0.001													
1,1,1-Trichloroethane	<0.001													
Vinyl chloride	<0.001													
Benzene	<0.001													
Toluene	<0.001													
NON-PRIORITY POLLUTANTS														
OTHER ORGANICS														
Xylenes, total	<0.001													
Acetone	<0.006													
Aniline	<0.19													
Benzo(k)fluoranthene	<0.074													
Benzoic acid	<0.93													
Benzyl alcohol	<0.037													
2-Butanone (MEK)	<0.003													
Carbon disulfide	<0.001													
1,2-cis-Dichloroethylene	<0.001													
Chloroaniline	<0.037													
Dibenzofuran	<0.037													
2-Hexanone (MNBK)	<0.003													
4-Methyl-2-pentanone (MIBK)	<0.003													
2-Methyl phenol	<0.037													

TABLE 1. SUMMARY OF QUALITY CONTROL LAB ANALYTIC DATA

Constituent Concentration, parts per million (ppm, mg/l, mg/kg)

Sample Location	lab-1	SM1(11)-1	SM1(11)-2	SM1(11)-3	SM1(11)-4	SM1(11)-5	SM1(11)-6	Lab A	Lab B	Lab C	Lab D	Lab E	Lab F	Lab G
Sample Identification	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well
Sample Date	24-Aug 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	21-Nov 1988	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88
Sample Type	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Sample Depth, Ft	3	2	1.5	2	2	3	1	3	6	3	6	3	6	3
Laboratory	Laucks	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS
Report Number or Date	11678	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	28-Nov-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88
Laboratory Sample Number	3	E-12,163	E-12,164	E-12,165	E-12,166	E-12,167	E-12,168	E-12,381	E-12,382	E-12,383	E-12,384	E-12,385	E-12,386	E-12,387
4-Methyl phenol	<0.037													
2-Methyl naphthalene	<0.037													
2-Nitroaniline	<0.074													
3-Nitroaniline	<0.19													
4-Nitroaniline	<0.074													
Styrene	<0.001													
2,4,5-Trichlorophenol	<0.074													
Vinyl acetate	<0.001													
total 1,2-Dichloroethylene	<0.001													
OTHER PARAMETERS														
Total Petroleum Hydrocarbons														
E P TOXICITY														
Arsenic														
Barium														
Cadmium														
Chromium														
Copper														
Lead								<0.02		<0.02		<0.02		
Mercury								0.026		0.017		0.1		
Nickel														
Selenium														
Silver														
Zinc														

TABLE 1. SUMMARY OF QUALITY CONTROL LAB ANALYTIC DATA

Constituent Concentration, parts per million (ppm, mg/l, mg/kg)

Sample Location	Lab H	Lab I	Lab J	Lab K	Lab L	Lab M	Lab N	Lab O	AB-2	IJ-2	I	II	Background
Sample Identification	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	Sample Hanna
Sample Date	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	09-Dec-88	09-Dec-88	09-Dec-88	09-Dec-88	15-Sep 1988
Sample Type	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Sample Depth, Ft	6	3	6	2	5	2	5	3	10	10	10	10	2.5
Laboratory	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	Lauck
Report Number or Date	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	12-Dec-88	12-Dec-88	12-Dec-88	12-Dec-88	12170
Laboratory Sample Number	E-12,388	E-12,389	E-12,390	E-12,391	E-12,392	E-12,393	E-12,394	E-12,395	E-12,829	E-12,830	E-12,831	E-12,832	sample
PRIORITY POLLUTANTS													
METALS													
Antimony													<0.5
Arsenic													4.0
Beryllium													<0.1
Cadmium													<0.5
Chromium													16.
Copper													12.
Lead	18	160	92	5	2	6	6	18					<10.
Mercury	65	220	1300	1.2	0.91	0.072	0.22	48	110	16	18	27	<0.1
Nickel													10.
Selenium													<0.5
Silver													<1.
Thallium													<0.5
Zinc													40.
MISCELLANEOUS													
Total Phenol													<0.5
Total Cyanide													<0.5
BASE-NEUTRAL EXTRACTABLES													
Acenaphthene													<0.037
Acenaphthylene													<0.037
Anthracene													<0.037
Benzidine													<0.930
Benzo(a)anthracene													<0.037
Benzo(a)pyrene													<0.074
Benzo(b)fluoranthene													<0.074
Benzo(ghi)perylene													<0.074
Bis(2-chloroethoxyl) methane													<0.037
Bis(2-chloroethyl) ether													<0.037
Bis(2-chloroisopropyl) ether													<0.037
Bis(2-ethylhexyl) phthalate													<0.037
4-Bromophenyl phenyl ether													<0.074
Butyl benzyl phthalate													<0.037
2-Chloronaphthalene													<0.037
Chrysene													<0.037
4-Chlorophenyl phenyl ether													<0.037

TABLE 1. SUMMARY OF QUALITY CONTROL LAB ANALYTIC DATA

Constituent Concentration, parts per million (ppm, mg/l, mg/kg)

Sample Location	Lab H	Lab I	Lab J	Lab K	Lab L	Lab M	Lab N	Lab O	AB-2	IJ-2	I	II	Background
Sample Identification	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	Sample Hanna
Sample Date	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	09-Dec-88	09-Dec-88	09-Dec-88	09-Dec-88	15-Sep 1988
Sample Type	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Sample Depth, Ft	6	3	6	2	5	2	5	3	10	10	10	10	2.5
Laboratory	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	Lauck
Report Number or Date	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	12-Dec-88	12-Dec-88	12-Dec-88	12-Dec-88	12170
Laboratory Sample Number	E-12,388	E-12,389	E-12,390	E-12,391	E-12,392	E-12,393	E-12,394	E-12,395	E-12,829	E-12,830	E-12,831	E-12,832	sample
Dibenzo(a,h)anthracene													<0.074
1,2-Dichlorobenzene													<0.037
1,3-Dichlorobenzene													<0.037
1,4-Dichlorobenzene													<0.037
3,3-Dichlorobenzidine													<0.370
Diethyl phthalate													<0.037
Dimethyl phthalate													<0.037
Di-n-Butyl phthalate													<0.037
2,4-Dinitrotoluene													<0.074
2,6-Dinitrotoluene													<0.037
Di-n-octyl phthalate													<0.037
1,2-Diphenylhydrazine													<0.074
Fluoranthene													<0.037
Fluorene													<0.037
Hexachlorobenzene													<0.037
Hexachlorobutadiene													<0.037
Hexachlorocyclopentadiene													<0.074
Hexachloroethane													<0.074
Indeno(1,2,3-cd)pyrene													<0.074
Isophorone													<0.037
Napthalene													<0.074
Nitrobenzene													<0.037
N-nitrosodi-n-propylamine													<0.037
N-Nitrosodiphenylamine													<0.037
Phenanthrene													<0.037
Pyrene													<0.037
1,2,4-Trichlorobenzene													<0.037
ACID EXTRACTABLES													
2-Chlorophenol													<0.037
2,4-Dichlorophenol													<0.074
2,4-Dimethylphenol													<0.037
4,6-Dinitro-o-cresol													
2,4-Dinitrophenol													<0.370
2-Nitrophenol													<0.074
4-Nitrophenol													<0.370
p-Chloro-m-cresol													
Pentachlorophenol													<0.370

TABLE 1. SUMMARY OF QUALITY CONTROL LAB ANALYTIC DATA

Constituent Concentration, parts per million (ppm, mg/l, mg/kg)

Sample Location	Lab H	Lab I	Lab J	Lab K	Lab L	Lab M	Lab N	Lab O	AB-2	IJ-2	I	II	Background
Sample Identification	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	Sample Hanna
Sample Date	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	09-Dec-88	09-Dec-88	09-Dec-88	09-Dec-88	15-Sep 1988
Sample Type	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Sample Depth, Ft	6	3	6	2	5	2	5	3	10	10	10	10	2.5
Laboratory	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	Lauck
Report Number or Date	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	12-Dec-88	12-Dec-88	12-Dec-88	12-Dec-88	12170
Laboratory Sample Number	E-12,388	E-12,389	E-12,390	E-12,391	E-12,392	E-12,393	E-12,394	E-12,395	E-12,829	E-12,830	E-12,831	E-12,832	sample
2-Chloroethylvinyl ether													<0.037
Chloroform (Trichloromethane)													<0.002
Chloromethane													<0.002
Dibromochloromethane													<0.005
1,1-Dichloroethane													<0.002
1,2-Dichloroethane													<0.002
1,1-Dichloroethylene													<0.002
1,2-Dichloropropane													<0.002
1,3-Dichloropropylene (cs&ts)													<0.005
Ethylbenzene													0.002
Methylene chloride													1.600
1,1,2,2-Tetrachloroethane													<0.005
Tetrachloroethylene													<0.002
1,2-trans-Dichloroethylene													<0.002
1,1,2-Trichloroethane													<0.002
Trichloroethylene (TCE)													<0.002
1,1,1-Trichloroethane													<0.002
Vinyl chloride													<0.002
Benzene													<0.002
Toluene													0.006
NON-PRIORITY POLLUTANTS													
OTHER ORGANICS													
Xylenes, total													0.006
Acetone													0.050
Aniline													<0.190
Benzo(k)fluoranthene													<0.074
Benzoic acid													<0.930
Benzyl alcohol													<0.037
2-Butanone (MEK)													<0.005
Carbon disulfide													<0.002
1,2-cis-Dichloroethylene													<0.002
Chloroaniline													<0.037
Dibenzofuran													<0.037
2-Hexanone (MNBK)													<0.005
4-Methyl-2-pentanone (MIBK)													<0.005
2-Methyl phenol													<0.037

TABLE 1. SUMMARY OF QUALITY CONTROL LAB ANALYTIC DATA

Constituent Concentration, parts per million (ppm, mg/l, mg/kg)

Sample Location	Lab H	Lab I	Lab J	Lab K	Lab L	Lab M	Lab N	Lab O	AB-2	IJ-2	I	II	Background
Sample Identification	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	QC lab dry well	Sample Hanna
Sample Date	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	30-Nov-88	09-Dec-88	09-Dec-88	09-Dec-88	09-Dec-88	15-Sep 1988
Sample Type	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Sample Depth, Ft	6	3	6	2	5	2	5	3	10	10	10	10	2.5
Laboratory	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	CCAS	Lauck
Report Number or Date	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	06-Dec-88	12-Dec-88	12-Dec-88	12-Dec-88	12-Dec-88	12170
Laboratory Sample Number	E-12,388	E-12,389	E-12,390	E-12,391	E-12,392	E-12,393	E-12,394	E-12,395	E-12,829	E-12,830	E-12,831	E-12,832	sample
4-Methyl phenol													<0.037
2-Methyl naphthalene													<0.037
2-Nitroaniline													<0.074
3-Nitroaniline													<0.190
4-Nitroaniline													<0.074
Styrene													<0.002
2,4,5-Trichlorophenol													<0.074
Vinyl acetate													<0.002
total 1,2-Dichloroethylene													<0.002
OTHER PARAMETERS													
Total Petroleum Hydrocarbons													
E P TOXICITY													
Arsenic													
Barium													
Cadmium													
Chromium													
Copper													
Lead													
Mercury													
Nickel													
Selenium													
Silver													
Zinc													
					<0.02	0.048			<0.02	0.17			

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Chemistry, Microbiology, and Technical Services

CLIENT: ERM Northwest
2535 152nd Ave. N.E., Suite B-2
Redmond, WA 98052
ATTN: Mark Menard

LABORATORY NO. 14958

DATE: Oct. 11, 1988

REPORT ON: SOIL

SAMPLE IDENTIFICATION: Submitted 8/24/88 and identified as shown:

Lab-1 Lab Drywell

Prior to sieving, a sample split was removed for the volatile organics portion of the analysis. The remainder of the sample was then passed through a No. 10 sieve, with percent retained and description of retained matter shown below. Only material passing the sieve was analyzed for the remainder of the analyses.

% Retained	Major Description
46.	rock

	Sample	Lab Blank
Total Solids, %	89.8	-
	parts per million (mg/kg), dry basis	
Total Cyanide	<0.5	<0.5
Total Phenol	<0.5	<0.5

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Sample was analyzed in accordance with Test Methods for Evaluating Solid Waste (SW-846), U.S.E.P.A., 1986, Method 8240 (volatile organics).

parts per billion (ug/kg), dry basis

	Sample	Lab Blank
Chloromethane	<1.	<1.
Bromomethane	<1.	<1.
Vinyl Chloride	<1.	<1.
Chloroethane	<3.	<3.
Methylene Chloride	<1.	<1.
Acetone	<6.	<5.
Carbon Disulfide	<1.	<1.
1,1-Dichloroethene	<1.	<1.
1,1-Dichloroethane	<1.	<1.
trans-1,2-Dichloroethenene	<1.	<1.
cis-1,2-Dichloroethene	<1.	<1.
Total-1,2-Dichloroethene	<1.	<1.
Chloroform	<1.	<1.
2-Butanone	<3.	<3.
1,2-Dichloroethane	<1.	<1.

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parts per billion (ug/kg), dry basis

	Sample	Lab Blank
1,1,1-Trichloroethane	<1.	<1.
Carbon Tetrachloride	<1.	<1.
Vinyl Acetate	<1.	<1.
Bromodichloromethane	<1.	<1.
1,2-Dichloropropane	<1.	<1.
Trichloroethene	<1.	<1.
Benzene	<1.	<1.
Dibromochloromethane	<3.	<3.
1,1,2-Trichloroethane	<1.	<1.
Bromoform	<1.	<1.
4-Methyl-2-pentanone	<3.	<3.
2-Hexanone	<3.	<3.
1,1,2,2-Tetrachloroethane	<3.	<3.
Tetrachloroethene	<1.	<1.
Toluene	<1.	<1.
Chlorobenzene	<3.	<3.
trans-1,3-Dichloropropene	<3.	<3.
Ethylbenzene	<1.	<1.
cis-1,3-Dichloropropene	<3.	<3.
Styrene	<1.	<1.
Total Xylenes	<1.	<1.

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Sample was analyzed in accordance with Test Methods for Evaluating Solid Waste (SW-846) U.S.E.P.A. 1986 Method 8270 (semi-volatile extractables).

parts per billion (ug/kg), dry basis

	Sample	Lab Blank
Phenol	<37.	<33.
Aniline	<190.	<170.
bis(2-Chloroethyl)Ether	<37.	<33.
2-Chlorophenol	<37.	<33.
1,3-Dichlorobenzene	<37.	<33.
1,4-Dichlorobenzene	<37.	<33.
Benzyl Alcohol	<37.	<33.
1,2-Dichlorobenzene	<37.	<33.
2-Methylphenol	<37.	<33.
bis(2-Chloroisopropyl)Ether	<37.	<33.
4-Methylphenol	<37.	<33.
N-Nitroso-Di-n-Propylamine	<37.	<33.
Hexachloroethane	<74.	<67.
Nitrobenzene	<37.	<33.
Isophorone	<37.	<33.
2-Nitrophenol	<74.	<67.
2,4-Dimethylphenol	<37.	<33.
Benzoic Acid	<930.	<830.

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parts per billion (ug/kg), dry basis

	Sample	Lab Blank
bis(2-Chloroethoxy)Methane	<37.	<33.
2,4-Dichlorophenol	<74.	<67.
1,2,4-Trichlorobenzene	<37.	<33.
Naphthalene	<74.	<67.
4-Chloroaniline	<37.	<33.
Hexachlorobutadiene	<37.	<33.
4-Chloro-3-Methylphenol	<74.	<67.
2-Methylnaphthalene	<37.	<33.
Hexachlorocyclopentadiene	<74.	<67.
2,4,6-Trichlorophenol	<74.	<67.
2,4,5-Trichlorophenol	<74.	<67.
2-Chloronaphthalene	<37.	<33.
2-Nitroaniline	<74.	<67.
Dimethyl Phthalate	<37.	<33.
Acenaphthylene	<37.	<33.
3-Nitroaniline	<190.	<170.
Acenaphthene	<37.	<33.
2,4-Dinitrophenol	<370.	<330.
4-Nitrophenol	<370.	<330.
Dibenzofuran	<37.	<33.
2,4-Dinitrotoluene	<74.	<67.
2,6-Dinitrotoluene	<74.	<67.
Diethyl Phthalate	<37.	<33.
4-Chlorophenyl-Phenylether	<37.	<33.
Fluorene	<37.	<33.

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parts per billion (ug/kg), dry basis

	Sample	Lab Blank
4-Nitroaniline	<74.	<67.
4,6-Dinitro-2-Methylphenol	<370.	<330.
N-Nitrosodiphenylamine	<37.	<33.
1,2-Diphenylhydrazine	<74.	<67.
4-Bromophenyl-Phenylether	<74.	<67.
Hexachlorobenzene	<74.	<67.
Pentachlorophenol	<370.	<330.
Phenanthrene	<37.	<33.
Anthracene	<37.	<33.
Di-n-Butyl Phthalate	**190.**	<33.
Fluoranthene	<37.	<33.
Pyrene	<37.	<33.
Benzidine	<930.	<830.
Butylbenzylphthalate	<37.	<33.
3,3'Dichlorobenzidine	<370.	<330.
Benzo(a)Anthracene	<37.	<33.
bis(2-Ethylhexyl)Phthalate	**100.**	<33.
Chrysene	<37.	<33.
Di-n-Octyl Phthalate	<37.	<33.
Benzo(b)Fluoranthene	<74.	<67.
Benzo(k)Fluoranthene	<74.	<67.
Benzo(a)Pyrene	<74.	<67.
Indeno(1,2,3-cd)Pyrene	<74.	<67.
Dibenzo(a,h)Anthracene	<74.	<67.
Benzo(g,h,i)Perylene	<74.	<67.

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Sample was analyzed in accordance with Test Methods for Evaluating Solid Waste (SW-846), U.S.E.P.A., 1986, Method 8080 (pesticides and PCB's).

parts per billion (ug/kg), dry basis

	Sample	Lab Blank
alpha-BHC	<8.0	<8.0
beta-BHC	<8.0	<8.0
delta-BHC	<8.0	<8.0
gamma-BHC (lindane)	<8.0	<8.0
Heptachlor	<8.0	<8.0
Aldrin	<8.0	<8.0
Heptachlor epoxide	<8.0	<8.0
Endosulfan I	<8.0	<8.0
Dieldrin	<16.0	<16.0
4,4'-DDE	<16.0	<16.0
Endrin	<16.0	<16.0
Endosulfan II	<16.0	<16.0
4,4'-DDD	<16.0	<16.0
Endosulfan sulfate	<16.0	<16.0
4,4'-DDT	<16.0	<16.0
Methoxychlor	<80.	<80.
Endrin ketone	<16.0	<16.0
alpha-Chlordane	<80.	<80.
gamma-Chlordane	<80.	<80.
Toxaphene	<160.	<160.

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parts per billion (ug/kg), dry basis

	Sample	Lab Blank
Arochlor-1016	<80.	<80.
Arochlor-1221	<80.	<80.
Arochlor-1232	<80.	<80.
Arochlor-1242	<80.	<80.
Arochlor-1248	<80.	<80.
Arochlor-1254	<160.	<160.
Arochlor-1260	<160.	<160.
Endrin Aldehyde	<16.0	<16.0

Key

< = less than

Respectfully submitted,

Laucks Testing Laboratories, Inc.

J. M. Owens

JMO:veg

Laucks 81 years
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APPENDIX

Surrogate Recovery Quality Control Report

Attached are surrogate (chemically similar) compounds utilized in the analysis of organic compounds. The surrogates are added to every sample prior to extraction and analysis to monitor for matrix effects, purging efficiency, and sample processing errors. The control limits represent the 95% confidence interval established in our laboratory through repetitive analysis of these sample types.

Sample No.	Surrogate Compound	% Recovery	Control Limits
(Volatiles)			
Blank	d4-1,2-Dichloroethane	93.	74-125
	d8-Toluene	104.	77-121
	p-Bromofluorobenzene	95.	75-115
Sample	d4-1,2-Dichloroethane	100.	74-125
	d8-Toluene	106.	77-121
	p-Bromofluorobenzene	92.	75-115

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Sample No.	Surrogate Compound	% Recovery	Control Limits
(Semi-volatiles)			
Blank	2-Fluorophenol	77.	30-99
	d5-Phenol	72.	27-105
	2-Bromophenol	78.	30-107
	d5-Nitrobenzene	70.	45-100
	2-Fluorobiphenyl	74.	54-103
	d10-Azobenzene	73.	34-123
	2,4,6-Tribromophenol	62.	10-158
	d14-p-Terphenyl	89.	29-130
Sample	2-Fluorophenol	73.	30-99
	d5-Phenol	72.	27-105
	2-Bromophenol	73.	30-107
	d5-Nitrobenzene	68.	45-100
	2-Fluorobiphenyl	75.	54-103
	d10-Azobenzene	83.	34-123
	2,4,6-Tribromophenol	71.	10-158
	d14-p-Terphenyl	96.	29-130
(Pesticides)			
Blank	Dibutylchlorendate	77.	20-156
	Isodrin	64.	20-112
Sample	Dibutylchlorendate	88.	20-156
	Isodrin	69.	20-112

The ERM Group

Sample Chain of Custody

W.O.No.: 36-08 | Project Name: Silicon Metaltech

Sampler: Mark C. Menard

ERM Sample Number	Date	Time	COMP	GRAB	Sample Location	Number of Containers	Cr, Cu, Ni	Cd, Hg, Pb				Remarks
	11-21	1515		X	SM1 (11) - 1	1	x	x		E-1	2,163	① Need RUSH
	11-21	1515		x	SM1 (11) - 2	1	x	x		1	2,164	results by 11/28.
	11-21	1515		x	SM1 (11) - 3	1	x	x		1	2,165	
	11-21	1515		x	SM1 (11) - 4	1	x	x		1	2,166	② Please retain all
	11-21	1515		x	SM1 (11) - 5	1	x	x		1	2,167	unused sample for
	11-21	1515		X	SM1 (11) - 6	1	x	x		1	2,168	possible EP Tox
												analysis.

Sample Relinquished	Date	Time	Sample Received by:	Date	Time	Reason for Transfer
			Martha Kolodack	11-23-88	11:50	

COPIES: White & Yellow copies accompany sample shipment to laboratory. Yellow copy retained by laboratory. White copy to be returned to ERM for files. Pink copy retained by sampler. Gold copy extra copy as needed (warehouse).

AIR, WATER & HAZARDOUS WASTE LABORATORY (No.131) CERTIFIED by CALIFORNIA DEPT of HEALTH SERVICES

Central Coast Analytical Services

Central Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: E-12,163
Collected: 11/21/88
Received: 11/23/88
Tested: As Listed
Collected by: Mark Menard

ATTN: Mark Menard
ERM-Northwest
2535 152nd Avenue, Suite B2
Redmond, WA 98052

Sample Description:
Project #36-88, Silicon Metaltech
SM1 (11)-1, Soil

*Digested by EPA 3050 on 11/23/88 by MM

REPORT

CONSTITUENT	EPA METHOD	DATE	ANALYST	DETECTION LIMIT mg/kg	TOTAL LEVEL mg/kg	DUPLICATE mg/kg	SPIKE % Recovery	**TTLC mg/kg
*CADMIUM	7130	11/26/88	KM	0.3	<0.3	<0.3	99.	100.
*CHROMIUM, TOTAL	6010	11/25/88	MM	3.	16.	16.	94.	2500.
*COPPER	6010	11/25/88	MM	3.	22.	21.	95.	2500.
*LEAD	7420	11/25/88	MM	1.	<1.	<1.	104.	1000.
MERCURY	7471	11/27/88	KM	0.002	13.	13.	103.	20.
*NICKEL	6010	11/25/88	MM	3.	16.	15.	98.	2000.

***TOTAL THRESHOLD LIMIT CONCENTRATION as listed in 22 Cal Adm Code Art 11 Sec. 66699 as persistent & bioaccumulative toxic substance.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

11/28/88
E12163ME.WR1/#216
MH/ke

Mary Havlicek, Ph.D., President

AIR, WATER & HAZARDOUS WASTE LABORATORY (No.131) CERTIFIED by CALIFORNIA DEPT of HEALTH SERVICES

Central Coast Analytical Services

Central Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: E-12,164
Collected: 11/21/88
Received: 11/23/88
Tested: As Listed
Collected by: Mark Menard

ATTN: Mark Menard
ERM-Northwest
2535 152nd Avenue, Suite B2
Redmond, WA 98052

Sample Description:
Project #36-88, Silicon Metaltech
SM1 (11)-2, Soil

*Digested by EPA 3050 on 11/23/88 by MM

REPORT

CONSTITUENT	EPA METHOD	DATE	ANALYST	DETECTION LIMIT mg/kg	TOTAL LEVEL mg/kg	TTLC*** mg/kg
*CADMIUM	7130	11/26/88	KM	0.3	<0.3	100.
*CHROMIUM, TOTAL	6010	11/25/88	MM	3.	6.	2500.
*COPPER	6010	11/25/88	MM	3.	11.	2500.
*LEAD	7420	11/25/88	MM	1.	150.	1000.
MERCURY	7471	11/27/88	KM	0.002	1400.	20.
*NICKEL	6010	11/25/88	MM	3.	<3.	2000.

***TOTAL THRESHOLD LIMIT CONCENTRATION as listed in 22 Cal Adm Code Art 11 Sec. 66699 as persistent & bioaccumulative toxic substance.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D., President

11/28/88
E12164ME.WR1/#216
MH/ke

Central Coast Analytical Services

Central Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: E-12,165
Collected: 11/21/88
Received: 11/23/88
Tested: As Listed
Collected by: Mark Menard

ATTN: Mark Menard
ERM-Northwest
2535 152nd Avenue, Suite B2
Redmond, WA 98052

Sample Description:
Project #36-88, Silicon Metaltech
SM1 (11)-3, Soil

*Digested by EPA 3050 on 11/23/88 by MM

REPORT

CONSTITUENT	EPA METHOD	DATE	ANALYST	DETECTION LIMIT mg/kg	TOTAL LEVEL mg/kg	TTLC*** mg/kg
*CADMIUM	7130	11/26/88	KM	0.3	0.3	100.
*CHROMIUM, TOTAL	6010	11/25/88	MM	3.	34.	2500.
*COPPER	6010	11/25/88	MM	3.	17.	2500.
*LEAD	7420	11/25/88	MM	1.	46.	1000.
MERCURY	7471	11/27/88	KM	0.002	4000.	20.
*NICKEL	6010	11/25/88	MM	3.	6.	2000.

***TOTAL THRESHOLD LIMIT CONCENTRATION as listed in 22 Cal Adm Code Art 11 Sec. 66699 as persistent & bioaccumulative toxic substance.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D., President

11/28/88
E12165ME.WR1/#216
MH/ke

AIR, WATER & HAZARDOUS WASTE LABORATORY (No.131) CERTIFIED by CALIFORNIA DEPT of HEALTH SERVICES

Central Coast Analytical Services

Central Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: E-12,166
Collected: 11/21/88
Received: 11/23/88
Tested: As Listed
Collected by: Mark Menard

ATTN: Mark Menard
ERM-Northwest
2535 152nd Avenue, Suite B2
Redmond, WA 98052

Sample Description:
Project #36-88, Silicon Metaltech
SM1 (11)-4, Soil

*Digested by EPA 3050 on 11/23/88 by MM

REPORT

CONSTITUENT	EPA METHOD	DATE	ANALYST	DETECTION LIMIT mg/kg	TOTAL LEVEL mg/kg	TTLC*** mg/kg
*CADMIUM	7130	11/26/88	KM	0.3	<0.3	100.
*CHROMIUM, TOTAL	6010	11/25/88	MM	3.	11.	2500.
*COPPER	6010	11/25/88	MM	3.	26.	2500.
*LEAD	7420	11/25/88	MM	1.	68.	1000.
MERCURY	7471	11/27/88	KM	0.002	4000.	20.
*NICKEL	6010	11/25/88	MM	3.	5.	2000.

***TOTAL THRESHOLD LIMIT CONCENTRATION as listed in 22 Cal Adm Code Art 11 Sec. 66699 as persistent & bioaccumulative toxic substance.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Mary Havlicek, Ph.D., President

11/28/88
E12166ME.WR1/#216
MH/ke

AIR, WATER & HAZARDOUS WASTE LABORATORY (No.131) CERTIFIED by CALIFORNIA DEPT of HEALTH SERVICES

Central Coast Analytical Services

Central Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: E-12,167
Collected: 11/21/88
Received: 11/23/88
Tested: As Listed
Collected by: Mark Menard

ATTN: Mark Menard
ERM-Northwest
2535 152nd Avenue, Suite B2
Redmond, WA 98052

Sample Description:
Project #36-88, Silicon Metaltech
SM1 (11)-5, Soil

*Digested by EPA 3050 on 11/23/88 by MM

REPORT

CONSTITUENT	EPA METHOD	DATE	ANALYST	DETECTION LIMIT mg/kg	TOTAL LEVEL mg/kg	TTLC*** mg/kg
*CADMIUM	7130	11/26/88	KM	0.3	<0.3	100.
*CHROMIUM, TOTAL	6010	11/25/88	MM	3.	21.	2500.
*COPPER	6010	11/25/88	MM	3.	57.	2500.
*LEAD	7420	11/25/88	MM	1.	31.	1000.
MERCURY	7471	11/27/88	KM	0.002	1.4	20.
*NICKEL	6010	11/25/88	MM	3.	22.	2000.

***TOTAL THRESHOLD LIMIT CONCENTRATION as listed in 22 Cal Adm Code Art 11 Sec. 66699 as persistent & bioaccumulative toxic substance.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D., President

11/28/88
E12167ME.WR1/#216
MH/ke

Central Coast Analytical Services

Central Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: E-12,168
Collected: 11/21/88
Received: 11/23/88
Tested: As Listed
Collected by: Mark Menard

ATTN: Mark Menard
ERM-Northwest
2535 152nd Avenue, Suite B2
Redmond, WA 98052

Sample Description:
Project #36-88, Silicon Metaltech
SM1 (11)-6, Soil

*Digested by EPA 3050 on 11/23/88 by MM

REPORT

CONSTITUENT	EPA METHOD	DATE	ANALYST	DETECTION LIMIT mg/kg	TOTAL LEVEL mg/kg	TTLC*** mg/kg
*CADMIUM	7130	11/26/88	KM	0.3	1.9	100.
*CHROMIUM, TOTAL	6010	11/25/88	MM	3.	93.	2500.
*COPPER	6010	11/25/88	MM	3.	27.	2500.
*LEAD	7420	11/25/88	MM	1.	35.	1000.
MERCURY	7471	11/27/88	KM	0.002	35.	20.
*NICKEL	6010	11/25/88	MM	3.	23.	2000.

***TOTAL THRESHOLD LIMIT CONCENTRATION as listed in 22 Cal Adm Code Art 11 Sec. 66699 as persistent & bioaccumulative toxic substance.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Mary Havlicek

Mary Havlicek, Ph.D., President

11/28/88
E12168ME.WR1/#216
MH/ke

The ERM Group

Sample Chain of Custody

W.O.No.: 36-88 Project Name: Silicon Metal Tech

Sampler: Mark Menard

ERM Sample Number	Date	Time	COMP	GRAB	Sample Location	Number of Containers	Total Hg	Total Pb	EP Tox				Remarks
	11/30	1230		X	SMILAB-A	1	✓	✓	✓				LOC 1, 1.0 E-12,381
	11/30	1230		X	SMILAB-B	1	✓	✓	✓				LOC 1, 3.0 E-12,382
	11/30	1245		X	SMILAB-C	1	✓	✓	✓				LOC 2, 1.0 E-12,383
	11/30	1245		X	SMILAB-D	1	✓	✓	✓				LOC 2, 3.0 E-12,384
	11/30	1300		X	SMILAB-E	1	✓	✓	✓				LOC 3, 1.0 E-12385
	11/30	1300		X	SMILAB-F	1	✓	✓	✓				LOC 3, 3.0 E-12386
	11/30	1310		X	SMILAB-G	1	✓	✓	✓				LOC 4, 1.0 E-12387
	11/30	1310		X	SMILAB-H	1	✓	✓	✓				LOC 4, 3.0 E-12,388
	11/30	1325		X	SMILAB-I	1	✓	✓	✓				LOC 5, 1.0 E-12,389
	11/30	1325		X	SMILAB-J	1	✓	✓	✓				LOC 5, 3.0 E-12,390

Sample Relinquished	Date	Time	Sample Received by:	Date	Time	Reason for Transfer
			Bertha Kebslack	12-2-88	1150	samples acid intact

COPIES White & Yellow copies accompany sample shipment to laboratory. Yellow copy retained by laboratory. White copy to be returned to ERM for files. Pink copy retained by sampler. Gold copy extra copy as needed (warehouse)

206-880/787

Laucks Testing Laboratories, Inc.

940 South Harney St. Seattle, Washington 98108 (206)767-5060

CHAIN OF CUSTODY RECORD

DATE 11/30 PAGE 2 OF 2

NAME Mark Menard
ADDRESS ERM-Northwest
2535 152nd Av NE
ATTENTION Suite B2
PROJECT NAME Redmond, WA 98052
JOB/PO NO 36-88
SAMPLER (SIGNATURE) Mark Menard (PRINTED NAME) MARK MENARD

LAB NO	LAB SA #	SAMPLE NO	DATE	TIME	LOCATION	Total Hg	Total Pb	EP Tox										NO. OF CONTAINERS	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
		SMILABK	11/30	1335		x	x	x				E-	12391					1	LOC 6, 1.0
		SMILABL	11/30	1335		x	x	x					12392					1	LOC 6, 3.0
		SMILABM	11/30		1345	x	x	x					12393					1	LOC 7, 1.0
		SMILABN	11/30		1345	x	x	x					12394					1	LOC 7, 3.0
		SMILABO	11/30		1355	x	x	x					12395					1	Inside drain line

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE		Bertha Krebsbach SIGNATURE	12-2-88
PRINTED NAME	TIME	Bertha Krebsbach PRINTED NAME	TIME 1150
COMPANY		CCAS COMPANY	
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE		SIGNATURE	
PRINTED NAME	TIME	PRINTED NAME LAUCKS TESTING LABS	TIME
COMPANY		COMPANY	

TOTAL NUMBER OF CONTAINERS:

INSTRUCTIONS:
1. Shaded areas for lab use only.
2. Complete in ballpoint pen. Draw one line through errors and initial.
3. Be specific in test requests.
4. Check off tests to be performed for each sample.
5. Retain final copy after signing.
6. Provide name and telephone of your contact person.

NAME

TELEPHONE

SHIPMENT METHOD:

SPECIAL SHIPMENT, HANDLING OR STORAGE REQUIREMENTS.

AIR, WATER & HAZARDOUS WASTE LABORATORY (No.131) CERTIFIED by CALIFORNIA DEPT of HEALTH SERVICES

DEC 12 1988

Central Coast Analytical Services

Central Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: As Listed
Collected: 11/30/88
Received: 12/02/88
Tested: As Listed
Collected by: Mark Menard

Attn: Mark Menard
ERM-Northwest
2535 152nd Ave. NE
Suite B2
Redmond, Wa. 98052

Sample Description:

SMILAB, Soil Samples As Listed

*DIGESTED BY EPA 3050 ON 12/05/88 BY RJ.

REPORT

LAB NUMBER	SAMPLE DESCRIPTION	LEVEL FOUND MERCURY, TOTAL mg/kg	LEVEL FOUND *LEAD, TOTAL mg/kg
EPA METHOD----------		7471	7420
DETECTION LIMIT----------		0.002	1.
DATE/ANALYST----------		12/06/88 KM	12/07/88 MM
**TTLC----------		20.	1000.
E-12,381	A	180.	36.
E-12,382	B	84.	14.
E-12,383	C	93.	41.
E-12,384	D	47.	37.
E-12,385	E	87.	25.
E-12,386	F	72.	21.
E-12,387	G	2370.	61.
E-12,388	H	65.	18.
E-12,389	I	220.	160.
E-12,390	J	1300.	92.
E-12,391	K	1.2	5.
E-12,392	L	0.91	2.
E-12,393	M	0.072	6.
E-12,394	N	0.22	6.
E-12,395	O	48.	18.
QD-12,395	DUPLICATE	50.	21.
QS-12,395	SPIKE	102% RECOVERY	102% RECOVERY

**TTLC: TOTAL THRESHOLD LIMIT CONCENTRATION as listed in 22 Cal Adm Code Article 11 Sec. 66699 as persistent and bioaccumulative toxic substance.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Mary Havlicek, Ph.D., President

12/07/88
E12381ER.WR1/221
MH/ah

AIR, WATER & HAZARDOUS WASTE LABORATORY (No.131) CERTIFIED by CALIFORNIA DEPT of HEALTH SERVICES

DEC 12 1988

Central Coast Analytical Services

Central Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: As Listed
Collected: 11/30/88
Received: 12/02/88
Tested: As Listed
Collected by: Mark Menard

ATTN: Mark Menard
ERM-Northwest
2535 152nd Ave. NE
Suite B2
Redmond, WA 98052

Sample Description:

Project #36-88
Silicon Metal Tech,
Soil Samples As Listed

REPORT EXTRACTED USING EP TOXICITY METHOD BY RJ ON 12/05/88.

LAB NUMBER	SAMPLE DESCRIPTION	LEVEL FOUND	
		SOLUBLE MERCURY mg/l	SOLUBLE LEAD mg/l
EPA METHOD----------		7470	7420
DETECTION LIMIT----------		0.002	0.02
DATE/ANALYST----------		12/07/88/MM	12/07/88/MM
**STLC----------		0.2	5.0
E-12,381	SMILAB-A	0.026	<0.02
E-12,384	SMILAB-D	0.017	<0.02
E-12,387	SMILAB-G	0.10	<0.02
E-12,389	SMILAB-I	0.048	<0.02
E-12,390	SMILAB-J	0.17	<0.02

**SOLUBLE THRESHOLD LIMIT CONCENTRATION as listed in 22 Cal Adm Code Art 11 Sec. 66699 as persistent & bioaccumlative toxic substance.

12/08/88
E12381EP.WR1/#222
MH/ke

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES
Mary Havlicek, Ph.D., President

The ERM Group

Sample Chain of Custody

W.O.No.: 59-88 | Project Name: Silicon Metaltech Hg

Sampler: Mark Menard

ERM Sample Number	Date	Time	COMP	GRAB	Sample Location	Number of Containers	Hg (Total)						Remarks
	12-9	1645		X	# AB-1 (two)	1	X						RUSH! E-12,829
	12-9	1645		X	# IJ-2 (two)	1	X						" 12,830
	12-9	1645		X	# I	1	X						" 12,831
	12-9	1645		X	# II	1	X						" 12,832

Sample Relinquished	Date	Time	Sample Received by:	Date	Time	Reason for Transfer
MLC.UL	12-9	1830				Ship to lab

COPIES: White & Yellow copies accompany sample shipment to laboratory. Yellow copy retained by laboratory. White copy to be returned to ERM for files. Pink copy retained by sampler. Gold copy extra copy as needed (warehouse).

Central Coast Analytical Services

Central Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: As Listed
Collected: 12/09/88 @ 1645
Received: 12/10/88 @ 1300
Tested: As Listed
Collected by: Mark Menard

ATTN: Mark Menard
ERM-Northwest
2535 152nd Avenue
Suite B-2
Redmond, WA 98052

Sample Description:

Silicon Metal Tech, Mercury
Soil Samples As Listed

REPORT

LAB NUMBER	SAMPLE DESCRIPTION	LEVEL FOUND
		MERCURY
EPA METHOD----------		7471
DETECTION LIMIT----------		Ø.ØØ2
DATE/ANALYST----------		12/12/88/MM
**TTLC----------		2Ø.
		mg/kg
E-12,829	AB-2	11Ø.
E-12,83Ø	IJ-2	16.
E-12,831	I	18.
E-12,832	II	27.

**TOTAL THRESHOLD LIMIT CONCENTRATION as listed in Cal Adm Code Art 11 Sec. 66699 as persistent & bioaccumlative toxic substance.

12/12/88
E12829NW.WR1/#223
MH/ke

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES
Mary Havlicek
Mary Havlicek, Ph.D., President

Laucks 80 years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

NOV 22 1988

Certificate

Chemistry, Microbiology, and Technical Services

CLIENT: ERM Northwest
2535 152nd Ave. N.E.
Redmond, WA 98052
ATTN: Mark Menard

LABORATORY NO. 12991

DATE: Nov. 19, 1988

REPORT ON: SOIL

SAMPLE IDENTIFICATION: Sample was originally submitted 8/24/88 and analyzed under our laboratory no. 11678. On 11/4, sample was re-numbered for additional analysis. Sample was further identified as shown below:

Lab-1 Lab Drywell

Sample was analyzed in accordance with Test Methods for Evaluating Solid Waste (SW-846), U.S.E.P.A., 1986, method 6010 and the 7000 series (metals analysis).

	Sample	Lab Blank
Total Solids, %	89.2	-
	parts per million (mg/kg), dry basis	
Antimony	<0.5	<0.5
Arsenic	3.1	<0.5
Beryllium	0.4	<0.1
Cadmium	<0.5	<0.5
Chromium	25.	<1.
Copper	19.	<1.
Lead	13.	<10.
Mercury	<0.1	<0.1
Nickel	16.	<2.
Selenium	<5.	<5.
Silver	<1.	<1.
Thallium	<0.5	<0.5
Zinc	62.	<1.

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Testing Laboratories, Inc.
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Certificate

Chemistry, Microbiology, and Technical Services

ERM Northwest

LABORATORY NO. 12991

Key

< = less than

Respectfully submitted,

Laucks Testing Laboratories, Inc.

J. M. Owens

JMO:veg

Laucks 80 years
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX 767-5063

Certificate

Chemistry, Microbiology, and Technical Services

CLIENT: ERM Northwest, Inc.
2535 - 152nd Ave. N.E., Suite B2
Redmond, WA 98052
ATTN: Mark Menard

LABORATORY NO. 12170

DATE: Nov. 22, 1988

REPORT ON: SOIL

SAMPLE IDENTIFICATION: Submitted 09/21/88 and identified as shown below:

ERM-NW Hanna Background 09/15/88 16:00

TESTS PERFORMED AND RESULTS:

	Sample
Total Solids, %	89.9
	parts per million (mg/kg), dry basis
Total Petroleum Hydrocarbons Oil & Grease	<20.

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ERM Northwest, Inc.

LABORATORY NO. 12170

Sample was analyzed for priority pollutants in accordance with Test Methods for Evaluating Solid Waste (SW-846) U.S.E.P.A., 1986, Method 8240 (volatile organics), 8270 (semi-volatile extractables), 8080 (pesticides and PCB's), 9010 (cyanide), and 6010 and the 7000 series (metals analysis). Phenol analysis was in accordance with Method 420.2, Methods for Chemical Analysis of Water & Wastes, U.S.E.P.A., March, 1983.

Inorganics

parts per million (mg/kg), dry basis

	Sample	Method Blank
Antimony	<0.5	<0.5
Arsenic	4.0	<0.5
Beryllium	<0.1	<0.1
Cadmium	<0.5	<0.5
Chromium	16.	<1.
Copper	12.	<1.
Lead	<10.	<10.
Mercury	<0.1	<0.1
Nickel	10.	<2.
Selenium	<0.5	<0.5
Silver	<1.	<1.
Thallium	<0.5	<0.5
Zinc	40.	<1.
Total Cyanide	<0.5	<0.5
Total Phenol	<0.5	<0.5

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Testing Laboratories, Inc.
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ERM Northwest, Inc.

LABORATORY NO. 12170

Volatile Organics (GC/MS)

parts per billion (ug/kg), dry basis

	Sample	Method Blank
Chloromethane	<2.	<1.
Bromomethane	<2.	<1.
Vinyl Chloride	<2.	<1.
Chloroethane	<5.	<3.
Methylene Chloride	1,600.	<1.
*Acetone	50.	<5.
*Carbon Disulfide	<2.	<1.
1,1-Dichloroethene	<2.	<1.
1,1-Dichloroethane	<2.	<1.
trans-1,2-Dichloroethene	<2.	<1.
cis-1,2-Dichloroethene	<2.	<1.
Total-1,2-Dichloroethene	<2.	<1.
Chloroform	<2.	<1.
*2-Butanone	<5.	<3.
1,2-Dichloroethane	<2.	<1.
1,1,1-Trichloroethane	<2.	<1.
Carbon Tetrachloride	<2.	<1.
*Vinyl Acetate	<2.	<1.
Bromodichloromethane	<2.	<1.
1,2-Dichloropropane	<2.	<1.
Trichloroethene	<2.	<1.
Benzene	<2.	<1.
Dibromochloromethane	<5.	<3.
1,1,2-Trichloroethane	<2.	<1.
Bromoform	<2.	<1.
*4-Methyl-2-pentanone	<5.	<3.
*2-Hexanone	<5.	<3.
1,1,2,2-Tetrachloroethane	<5.	<3.

Laucks 80 years
Testing Laboratories, Inc.
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Chemistry, Microbiology, and Technical Services

ERM Northwest, Inc.

LABORATORY NO. 12170

parts per billion (ug/kg), dry basis

	Sample	Method Blank
Tetrachloroethene	<2.	<1.
Toluene	6.	<1.
Chlorobenzene	<5.	<3.
trans-1,3-Dichloropropene	<5.	<3.
Ethylbenzene	2.	<1.
cis-1,3-Dichloropropene	<5.	<3.
*Styrene	<2.	<1.
*Total Xylenes	6.	<1.

Extractables (by GC/MS)

parts per billion (ug/kg), dry basis

	Sample	Method Blank
Phenol	<37.	<33.
*Aniline	<190.	<170.
Bis(2-Chloroethyl)Ether	<37.	<33.
2-Chlorophenol	<37.	<33.
1,3-Dichlorobenzene	<37.	<33.
1,4-Dichlorobenzene	<37.	<33.
*Benzyl Alcohol	<37.	<33.
1,2-Dichlorobenzene	<37.	<33.
*2-Methylphenol	<37.	<33.
Bis(2-Chloroisopropyl)Ether	<37.	<33.
*4-Methylphenol	<37.	<33.
N-Nitroso-Di-n-Propylamine	<37.	<33.

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Chemistry, Microbiology, and Technical Services

ERM Northwest, Inc.

LABORATORY NO. 12170

parts per billion (ug/kg), dry basis

	Sample	Method Blank
Hexachloroethane	<74.	<67.
Nitrobenzene	<37.	<33.
Isophorone	<37.	<33.
2-Nitrophenol	<74.	<67.
2,4-Dimethylphenol	<37.	<33.
*Benzoic Acid	<930.	<830.
Bis(2-Chloroethoxy)Methane	<37.	<33.
2,4-Dichlorophenol	<74.	<67.
1,2,4-Trichlorobenzene	<37.	<33.
Naphthalene	<74.	<67.
*4-Chloroaniline	<37.	<33.
Hexachlorobutadiene	<37.	<33.
4-Chloro-3-Methylphenol	<74.	<67.
*2-Methylnaphthalene	<37.	<33.
Hexachlorocyclopentadiene	<74.	<67.
2,4,6-Trichlorophenol	<74.	<67.
*2,4,5-Trichlorophenol	<74.	<67.
2-Chloronaphthalene	<37.	<33.
*2-Nitroaniline	<74.	<67.
Dimethyl Phthalate	<37.	<33.
Acenaphthylene	<37.	<33.
2,6-Dinitrotoluene	<74.	<67.
*3-Nitroaniline	<190.	<170.
Acenaphthene	<37.	<33.
2,4-Dinitrophenol	<370.	<330.
4-Nitrophenol	<370.	<330.
*Dibenzofuran	<37.	<33.
2,4-Dinitrotoluene	<74.	<67.

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parts per billion (ug/kg), dry basis

	Sample	Method Blank
Diethyl Phthalate	<37.	<33.
4-Chlorophenyl-Phenylether	<37.	<33.
Fluorene	<37.	<33.
*4-Nitroaniline	<74.	<67.
4,6-Dinitro-2-Methylphenol	<370.	<330.
N-Nitrosodiphenylamine	<37.	<33.
1,2-Diphenylhydrazine	<74.	<67.
4-Bromophenyl-Phenylether	<74.	<67.
Hexachlorobenzene	<37.	<33.
Pentachlorophenol	<370.	<330.
Phenanthrene	<37.	<33.
Anthracene	<37.	<33.
Di-n-Butyl Phthalate	<37.	41.
Fluoranthene	<37.	<33.
Pyrene	<37.	<33.
Benzidine	<930.	<830.
Butylbenzylphthalate	<37.	<33.
3,3'-Dichlorobenzidine	<370.	<330.
Benzo(a)Anthracene	<37.	<33.
Chrysene	<37.	<33.
Bis(2-Ethylhexyl)phthalate	<37.	<33.
Di-n-Octyl Phthalate	<37.	<33.
Benzo(b)Fluoranthene	<74.	<67.
Benzo(k)Fluoranthene	<74.	<67.
Benzo(a)Pyrene	<74.	<67.
Indeno(1,2,3-cd)Pyrene	<74.	<67.
Dibenzo(a,h)Anthracene	<74.	<67.
Benzo(g,h,i)Perylene	<74.	<67.

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Pesticides (by GC/ECD)

parts per billion (ug/kg), dry basis

	Sample	Method Blank
alpha-BHC	<9.0	<9.0
beta-BHC	<9.0	<9.0
delta-BHC	<9.0	<9.0
gamma-BHC (lindane)	<9.0	<9.0
Heptachlor	<9.0	<9.0
Aldrin	<9.0	<9.0
Heptachlor epoxide	<9.0	<9.0
Endosulfan I	<9.0	<9.0
Dieldrin	<18.0	<18.0
4,4'-DDE	<18.0	<18.0
Endrin	<18.0	<18.0
Endosulfan II	<18.0	<18.0
4,4'-DDD	<18.0	<18.0
Endosulfan sulfate	<18.0	<18.0
4,4'-DDT	<18.0	<18.0
Methoxychlor	<89.0	<89.0
Endrin ketone	<18.0	<18.0
alpha-Chlordane	<89.0	<89.0
gamma-Chlordane	<89.0	<89.0
Toxaphene	<178.0	<178.0
Arochlor-1016	<89.0	<89.0
Arochlor-1221	<89.0	<89.0
Arochlor-1232	<89.0	<89.0
Arochlor-1242	<89.0	<89.0
Arochlor-1248	<89.0	<89.0
Arochlor-1254	<178.0	<178.0
Arochlor-1260	<178.0	<178.0
Endrin Aldehyde	<18.0	<18.0

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Key

< indicates less than
* indicates additional compounds from the EPA's Hazardous Substances List.

Respectfully submitted,

Laucks Testing Laboratories, Inc.

J. M. Owens

JMO:emt

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APPENDIX A

Surrogate Recovery Quality Control Report

Attached are surrogate (chemically similar) compounds utilized in the analysis of organic compounds. The surrogates are added to every sample prior to extraction and analysis to monitor for matrix effects, purging efficiency, and sample processing errors. The control limits represent the 95% confidence interval established in our laboratory through repetitive analysis of these sample types.

Comment Key

D. Persistently poor surrogate and spike recoveries signal a laboratory problem and the need for re-extraction and re-analysis. However, occasional outliers are regarded as anomolies and, in this case, re-analysis was not deemed necessary because other indicators were in control.

JOB No. 12170 DATE: 10/05/88

Sample No. B0928MVOSS1 Matrix: Soil Analysis: MS-VOA

Surrogate Compound	Percent Recovery	Comment	Control Limits
d4-1.2-Dichloroethane	114		74 - 125
d8-Toluene	108		77 - 121
p-Bromofluorobenzene	109		75 - 115

Sample No. 01 Matrix: Soil Analysis: MS-VOA

Surrogate Compound	Percent Recovery	Comment	Control Limits
d4-1.2-Dichloroethane	101		74 - 125
d8-Toluene	97		77 - 121
p-Bromofluorobenzene	96		75 - 115

Sample No. 01DL Matrix: Soil Analysis: MS-VOA

Surrogate Compound	Percent Recovery	Comment	Control Limits
d4-1.2-Dichloroethane	119		74 - 125
d8-Toluene	116		77 - 121
p-Bromofluorobenzene	115		75 - 115

JOB No. 12170 DATE: 10/18/88

Sample No. B0928MPPSLT Matrix: Soil Analysis: MS-ABN

Surrogate Compound	Percent Recovery	Comment	Control Limits
2-Fluorophenol	80		30 - 99
d5-Phenol	67		27 - 105
2-Bromophenol	73		30 - 107
d5-Nitrobenzene	65		45 - 100
2-Fluorobiphenyl	70		54 - 103
d10-Azobenzene	64		34 - 123
2.4.6-Tribromophenol	90		10 - 158
d14-p-Terphenyl	90		29 - 130

Sample No. 1 Matrix: Soil Analysis: MS-ABN

Surrogate Compound	Percent Recovery	Comment	Control Limits
2-Fluorophenol	56		30 - 99
d5-Phenol	53		27 - 105
2-Bromophenol	55		30 - 107
d5-Nitrobenzene	45		45 - 100
2-Fluorobiphenyl	58		54 - 103
d10-Azobenzene	70		34 - 123
2.4.6-Tribromophenol	81		10 - 158
d14-p-Terphenyl	88		29 - 130

JOB No. 12170 DATE: 10/19/88

Sample No. B0928GPXSLT Matrix: Soil Analysis: PEST

Surrogate Compound	Percent Recovery	Comment	Control Limits
Dibutylchlorendate	166	D	20 - 156
Isodrin	98		20 - 112

Sample No. 1 Matrix: Soil Analysis: PEST

Surrogate Compound	Percent Recovery	Comment	Control Limits
Dibutylchlorendate	112		20 - 156
Isodrin	77		20 - 112

CHAIN OF CUSTODY RECORD

DATE 9-21-88 PAGE 1 OF 1

Laucks
Testing Laboratories, Inc.
940 South Harney St. Seattle Washington 98108 (206)767-5060

NAME Mark Menard
ADDRESS ERM - NW
152nd Av. NE, Ste B2
Redmond, WA 98052
ATTENTION:
PROJECT NAME Silicon Metal Tech
JOB/P.O. NO. 36-88
SAMPLER (SIGNATURE) (PRINTED NAME)

LAB NO.	LAB SA #	SAMPLE NO.	DATE	TIME	LOCATION	Priority Pollutants	TPH (418.1)											NO. OF CONTAINERS	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
		HANNA																	
		BACK	9/15	1600	West Side	x	x											4	
		GRAND																	

TESTING PARAMETERS

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	9/21	SIGNATURE	
PRINTED NAME: MARK MENARD	TIME: 5:20 pm	PRINTED NAME	TIME
COMPANY: ERM		COMPANY	
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE		SIGNATURE	9-21
PRINTED NAME	TIME	PRINTED NAME: Dena Groom	TIME: 5:20 pm
COMPANY		COMPANY: LAUCKS TESTING LABS	

TOTAL NUMBER OF CONTAINERS: 4

SHIPMENT METHOD:

SPECIAL SHIPMENT, HANDLING OR STORAGE REQUIREMENTS:

INSTRUCTIONS:
1. Shaded areas for lab use only.
2. Complete in ballpoint pen. Draw one line through errors and initial.
3. Be specific in test requests.
4. Check off tests to be performed for each sample.
5. Retain final copy after signing.
6. Provide name and telephone of your contact person.

NAME Mark Menard
TELEPHONE 285-1787

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APPENDIX B

Copy of Chain-of-Custody is Attached